Company valuation

Dr. Martin Užík
Agenda

• Basics
  – Motives to evaluate a company
  – Functions of company valuation

• Valuation methods
  – Overview
  – Basic considerations of present value models
  – Entire valuation approaches (Discounted Cash Flow [DCF], Capitalized Earning Power Approach, Comparable Company Analysis [CCA], Comparable Transaction Analysis [CTA])
  – Single valuation approaches (Value in case of liquidation, value of substance)
  – Modern approaches: Schwartz-Moon

• Case study
Basics: Motives to evaluate a company

- Decision depending and decision independent motives
- Transaction based and not transaction based motives
- Dominated and not dominated decisions

**Examples:** Buy or sell of companies or parts of companies, fair break down of inheritance, tax measurement, …
Basics: Functions of company valuation

- **Main functions**
  - Decision making and consulting
  - Mediation
  - Argumentation

- **Auxiliary functions**
  - Information
  - Tax measurement
  - Contract configuration
Valuation methods: Overview

Entire approaches
- Comparison Analysis
  - CCA
  - CTA
- Capitalized Earning Power Appr.
- DCF-Approaches

Single approaches
- Value of substance
- Value in case of liquidation
  - Schwartz-Moon
  - Others …

Other methods
- Mixed methods
- Modern approaches

Other methods
- Capitalized Earning Power Appr.
- DCF-Approaches

Entity Approach
- Equity Approach
- Weighted Average Cost of Capital (WACC)
- Adjusted Present Value (APV)
Überblick: Gesamtbewertungsverfahren

Entire approaches

- DCF Approach
- Capitalized Earning Power Approach
- Entity Approach
- Equity Approach

Comparison Analysis
- CCA
- CTA

capital market based (multiple approaches)

present value concepts (present values of future performance data)
Basic considerations of present value models

Future performance date is discounted to the present.

The present value in $t_0$ (PV) is the sum of present values of the individual performance data ($E$) in the periods $t_1$ till $T$:

$$PV = \sum_{t=1}^{T} \frac{E_t}{(1+r)^t}$$

$r$: capitalization rate
Overview: model versions

Basic components:

Terminal value: \( TV = \frac{E}{r} \)

Endless growth: \( PV = \frac{E_t}{r - g} \) mit \( E_{t+1} = E_t \cdot (1 + g) \)

PV: present value
TV: terminal value
E: future performance data
r: capitalization rate
g: growth rate
t, T: time indices
Overview: 2-stage-models

Depending on the degree of detail of the forecast of future performance data, different versions are possible:

**Endless growth in 2nd period:**

\[
PV = \sum_{t=1}^{T} \frac{E_t}{(1+r)^t} + \frac{E_{T+1}}{(r-g)(1+r)^T}
\]

Detailed stage \( t_1 \) till \( T \)

Forecast of terminal value from \( T+1 \)

**Terminal value in 2nd period:**

\[
TV = \sum_{t=1}^{T} \frac{E_t}{(1+r)^t} + \frac{E_{T+1}}{r(1+r)^T}
\]

Detailed stage \( t_1 \) till \( T \)

Forecast of terminal value from \( T+1 \)

**Symbols:**
- PV: present value
- TV: terminal value
- E: future performance data
- r: capitalization rate
- g: growth rate
- \( t, T \): time indices
Overview: What performance data is discounted?

<table>
<thead>
<tr>
<th>Capitalized Earnings Power Approach</th>
<th>DCF Entity Approach</th>
<th>DCF Equity Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted annual net profit from earnings report</td>
<td>Free Cash Flow respectively Total Cash Flow</td>
<td>Flow to Equity</td>
</tr>
</tbody>
</table>
### Overview: Cash Flow calculation

<table>
<thead>
<tr>
<th>Receipt of payment from operative business</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Pay-outs from operative business</td>
</tr>
<tr>
<td>= <strong>Cash Flow before interest and tax (CF)</strong></td>
</tr>
<tr>
<td>- Tax in case of complete equity financing</td>
</tr>
<tr>
<td>= <strong>Operating Cash Flow (OCF)</strong></td>
</tr>
<tr>
<td>- Cash Flow from investment activity</td>
</tr>
<tr>
<td>= <strong>Free Cash Flow (FCF)</strong></td>
</tr>
<tr>
<td>+ Tax Shield</td>
</tr>
<tr>
<td>= <strong>Total Cash Flow (TCF)</strong></td>
</tr>
<tr>
<td>+ / - Cash Flow from financing activity (incl. interest payments / receipts)</td>
</tr>
<tr>
<td>= <strong>Flow to Equity (FTE)</strong></td>
</tr>
</tbody>
</table>
Overview: How is the capitalization rate $r$ calculated?

<table>
<thead>
<tr>
<th>Capitalized Earnings Power Approach</th>
<th>DCF Entity Approach</th>
<th>DCF Equity Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claimed yield of shareholders (CAPM)</td>
<td>Average of capital costs (WACC)*</td>
<td>Claimed yield of shareholders (CAPM)</td>
</tr>
</tbody>
</table>

*) exception: APV-Approach, see following sheets...

The future risk is represented in the used capitalization rates. It can be seen as an extra charge on the risk free rate.

It would also be possible to consider the risk in the denominator (as an deduction).
Overview: Interpretation of the results

<table>
<thead>
<tr>
<th>Method</th>
<th>DCF Entity Approach</th>
<th>DCF Equity Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of equity</td>
<td>Value of the whole company</td>
<td>Value of equity</td>
</tr>
</tbody>
</table>

Subtract the market value of debt to calculate the value of equity.
DCF-Entity Approach: FCF-WACC

- Calculation of all invested capital (equity and debt)
- **Cost of capital** include interest and dividends, thus FCF
- Consideration of **tax shields** in the denominator (WACC)
- **Calculation problem**: To calculate the costs of capital, you need the capital structure. But this is the result of the calculation itself. **Solutions**: iteration, usage of planned capital structure.
DCF-Entity Approach: TCF-WACC

- Calculation of all invested capital (equity and debt)
- **Cost of capital** do not include the **tax shield**
- Tax shield is considered in the numerator (TCF)
DCF-Entity Approach: Adjusted Present Value (APV)

- Isolated consideration of cash flows:
  - operative business (calculation of a company value in case of complete equity financing)
  - tax shields

- No problems with variable capital structures (reality!) because the capital structure is not part of this model.
DCF-Entity Approach: Adjusted Present Value (APV)

\[ VC_{APV} = VC_{debt-free} + TS \]

- **VC**: value of the company
- **TS**: tax shield

Fiction of completely equity financed company (capital structure is not in consideration)

Adjustment with tax shield
DCF-Entity Approach: Adjusted Present Value (APV)

In case of terminal value:

\[ VC_{APV} = \frac{FCF}{r_{equity}} + \text{taxrate} \cdot \text{debt} \]

value of the company in case of complete equity financing  

\text{tax shield}

\[ r_{equity}: \text{claimed yield of shareholders} \]
\[ i: \text{interest rate of debt capital} \]

In case of 2 stage models:

\[ VC_{APV} = \sum_{t=1}^{T} \frac{FCF_t}{(1+r)^t} + \frac{FCF_{T+1}}{r \cdot (1+r)^T} + \sum_{t=1}^{T} \frac{i \cdot \text{taxrate} \cdot \text{debt}_{t-1}}{(1+i)^t} + \frac{i \cdot \text{taxrate} \cdot \text{debt}_T}{i \cdot (1+i)^T} \]

value of the company in case of complete equity financing  

\text{tax shield}
DCF-Equity Approach

- The cash flow for the shareholder is discounted (Flow to Equity – FTE). This approach is equivalent to the Capitalized Earnings Power Approach from the view of the shareholder.

- Problem: Every change of financing enforces a rebuilding of the planned Flow to Equity.
Comparison Analysis

- Selection of similar companies (comparable companies CC)
- Selection of comparative values CompV (e.g. earnings, turnover, EBIT, …)
- Calculation of a multiple $m$ (relation between the value of the comparable company $VC_{CC}$ and the comparative value of this company)
- Deduction of the value of the company which is to valuate (value of the valuation object $VC_{VO}$)
- Based on experience (multiple method), stock exchange prices (Similar Public Company Approach), proceeds of initial public offerings in the past (IPO Approach) or realised transaction prices (Recent Acquisition Approach).

\[
VC_{VO} = \text{Comp}V_{VO} \cdot m \\
m = \frac{VC_{CC}}{\text{Comp}V_{CC}}
\]
Single valuation approaches: Value in case of liquidation

- Split off the object of valuation into valuable parts.
- Fiction of liquidation of the company.
- Value the parts with sales market prices.
- Adjustment of single values from the balance sheet (e.g. specific liquidation costs). Debt has to be repayed.
- The value of liquidation depends on the intesity of the split off (synergies vs. atomization) and on the speed of the split off.
- The value of liquidation is in fact the lower limit of the value of the company.
Single valuation approaches: Value of substance

- Split off the object of valuation into valuable parts.
- Value of reproduction - How much is it to rebuild the company?
- Supply market based.
- Complete value of reproduction
  - Immaterial components are considered.
- Fractional value of reproduction:
  - Immaterial components aren't considered.
Single valuation approaches: Value of substance

- Problem: How should the reproduction of a brand or the defence against competitors be valued?

- Components which are not necessary for operative business are valued by the value in case of liquidation (as it is done by the other approaches too).

- The value of substance is the upper limit of the value of the company. No buyer would pay more... (Premises: Rebuilding is realistic and the additional competitor in form of the rebuilted company is irrelevant on the market.)
Schwartz-Moon

- Generalization of the Black-Scholes-Model (developed at 2000).

- Calculation of extremely high values is possible despite of negative cash flow forecasts (e.g. in the internet boom).

- The Brownian Motion with constant drift as it is used in the Black-Scholes-Model is replaced by a similar process with stochastic drift.

- The stochastic drift should represent the unsteady CFs, especially of internet companies.

- 17 estimated parameters are considered in the Schwartz-Moon model. In parts, the value of the company reacts very sensitive on the estimated parameters.
Case study „BMW“

Example for a Comparable Company Analysis in case of BMW
Case study „BMW“: Master Data

Bayerische Motoren Werke (BMW) AG manufactures and sells luxury cars and motorcycles worldwide. The Company produces everything from convertible sports cars to luxury sedans to touring motorcycles with large displacement engines.

**AKTIENDATEN**

<table>
<thead>
<tr>
<th>Datum</th>
<th>EUR</th>
<th>DIVIDENDE</th>
<th>Jährl.</th>
<th>EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0GPO Kurs</td>
<td>34.19</td>
<td>45DVD Indik. Brutto Rdte</td>
<td>2.05%</td>
<td></td>
</tr>
<tr>
<td>52Wo Hoch</td>
<td>51.49</td>
<td>Dvd Wachst. 5J.</td>
<td>6.13%</td>
<td></td>
</tr>
<tr>
<td>52Wo Tief</td>
<td>33.77</td>
<td>Ex-Datum Typ</td>
<td>Betr.</td>
<td></td>
</tr>
<tr>
<td>YTD Ändr</td>
<td>-8.53</td>
<td>5/16/07 Laufd.Bar</td>
<td>.7</td>
<td></td>
</tr>
<tr>
<td>YTD % Ändr</td>
<td>-19.97%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Round-Lot</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GÉWISS**

<table>
<thead>
<tr>
<th>GEWINN</th>
<th>EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Umlaufende 9/30/2007</td>
<td>601.995M</td>
</tr>
<tr>
<td>Marlkpk. EUR 22060.93M</td>
<td>321.47M</td>
</tr>
<tr>
<td>1.J.Gesamtcrtr. -22.56%</td>
<td>EPS 7.91 Lfr.Wachstum 5.60</td>
</tr>
<tr>
<td>BETA vs. DAX .92</td>
<td>KGV Sch 7.90 PEG Sch 1.41</td>
</tr>
<tr>
<td>Options, LEAPs verfügbar</td>
<td></td>
</tr>
</tbody>
</table>

Source: Bloomberg
Case study „BMW“: Price Chart

Source: Bloomberg
Case study „BMW“: Company Data (Income Statement)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ARD Erlöse</td>
<td>49999.00</td>
<td>46856.00</td>
<td>44335.00</td>
<td>41525.00</td>
<td>42282.00</td>
</tr>
<tr>
<td>ARD Umsatzkosten</td>
<td>37660.00</td>
<td>35992.00</td>
<td>34040.00</td>
<td>32090.00</td>
<td>31542.00</td>
</tr>
<tr>
<td>ARD Bruttogewinn</td>
<td>11339.00</td>
<td>10684.00</td>
<td>10295.00</td>
<td>9435.00</td>
<td>10740.00</td>
</tr>
<tr>
<td>ARD Allgemeine Betriebskosten</td>
<td>4972.00</td>
<td>4762.00</td>
<td>4649.00</td>
<td>4446.00</td>
<td>4903.00</td>
</tr>
<tr>
<td>ARD F &amp; E Aufwendungen</td>
<td>2544.00</td>
<td>2464.00</td>
<td>2334.00</td>
<td>2146.00</td>
<td>2011.00</td>
</tr>
<tr>
<td>ARD sonstiger betrieblicher Ausgaben</td>
<td>(227.00)</td>
<td>(345.00)</td>
<td>(461.00)</td>
<td>(510.00)</td>
<td>448.00</td>
</tr>
<tr>
<td>ARD Betriebsertrag</td>
<td>4050.00</td>
<td>3793.00</td>
<td>3774.00</td>
<td>3353.00</td>
<td>3378.00</td>
</tr>
<tr>
<td>ARD Beteiligungsverluste</td>
<td>25.00</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>ARD gesamte Finanzverluste</td>
<td>(98.00)</td>
<td>506.00</td>
<td>181.00</td>
<td>148.00</td>
<td>81.00</td>
</tr>
<tr>
<td>ARD Etrags vor Einkommen</td>
<td>4124.00</td>
<td>3287.00</td>
<td>3583.00</td>
<td>3205.00</td>
<td>3297.00</td>
</tr>
<tr>
<td>ARD Einkommenssteuern</td>
<td>1250.00</td>
<td>1046.00</td>
<td>1341.00</td>
<td>1258.00</td>
<td>1277.00</td>
</tr>
<tr>
<td>ARD Gewinn nach Minderheiten</td>
<td>2874.00</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>ARD Minderheitsbeteiligungen</td>
<td>6.00</td>
<td>NA</td>
<td>NA</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>ARD Nettoertrag</td>
<td>2869.00</td>
<td>2236.00</td>
<td>2242.00</td>
<td>1947.00</td>
<td>2020.00</td>
</tr>
<tr>
<td>ARD Umver. EPS vor Betriebsausgaben</td>
<td>NA</td>
<td>3.34</td>
<td>3.33</td>
<td>3.33</td>
<td>3.33</td>
</tr>
<tr>
<td>ARD Verwässertes EPS</td>
<td>NA</td>
<td>3.34</td>
<td>3.33</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: Bloomberg
### Case study „BMW“: Peer-Group-Overview

<table>
<thead>
<tr>
<th>Kategorie</th>
<th>Vorgaben</th>
<th>Peer</th>
<th>Aktionen</th>
<th>PV: Firmenansicht</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMW GR Equity</td>
<td>95</td>
<td>96</td>
<td>97</td>
<td></td>
</tr>
</tbody>
</table>

#### BAYER MOTOREN WK

<table>
<thead>
<tr>
<th>Überblick</th>
<th>Aktuell</th>
<th>Sch 1Jr</th>
<th>Vor 1Jr</th>
<th>Dschn. 5</th>
<th>Aktuell</th>
<th>Przt</th>
<th>Sch 1Jr</th>
<th>Aktuell</th>
<th>Przt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bewertung</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Kurs/Gewinn</td>
<td>8.88</td>
<td>8.72</td>
<td>10.77</td>
<td>10.55</td>
<td>13.25</td>
<td>21%</td>
<td>9.13</td>
<td>11.36</td>
<td>25%</td>
</tr>
<tr>
<td>2) PEG-Verhältnis</td>
<td>4.17</td>
<td>1.47</td>
<td>0.35</td>
<td>6.06</td>
<td>0.29</td>
<td>90%</td>
<td>0.53</td>
<td>0.53</td>
<td>98%</td>
</tr>
<tr>
<td>3) Kurs/Umsatz</td>
<td>0.47</td>
<td>0.44</td>
<td>0.63</td>
<td>0.54</td>
<td>0.51</td>
<td>44%</td>
<td>0.53</td>
<td>0.77</td>
<td>27%</td>
</tr>
<tr>
<td>4) Kurs/Cashflow</td>
<td>2.07</td>
<td>3.76</td>
<td>3.09</td>
<td>2.68</td>
<td>4.55</td>
<td>8%</td>
<td>4.64</td>
<td>n/a</td>
<td>6%</td>
</tr>
<tr>
<td>5) UMW/EBITDA</td>
<td>5.17</td>
<td>7.75</td>
<td>5.68</td>
<td>5.36</td>
<td>5.72</td>
<td>42%</td>
<td>6.56</td>
<td>n/a</td>
<td>17%</td>
</tr>
<tr>
<td>6) Wachstum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) Umsatzänderung T12</td>
<td>8.72</td>
<td>6.30</td>
<td>5.02</td>
<td>4.79</td>
<td>6.55</td>
<td>64%</td>
<td>6.30</td>
<td>7.66</td>
<td>35%</td>
</tr>
<tr>
<td>8) EPS vor X0-Änder</td>
<td>2.13</td>
<td>8.35</td>
<td>30.75</td>
<td>9.01</td>
<td>46.67</td>
<td>36%</td>
<td>24.84</td>
<td>22.33</td>
<td>28%</td>
</tr>
<tr>
<td>9) Bilanz &amp; CF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10) Schuld/Äqu</td>
<td>199.98</td>
<td>203.46</td>
<td>190.61</td>
<td>190.38</td>
<td>95.61</td>
<td>94%</td>
<td>101.44</td>
<td>405.19</td>
<td>80%</td>
</tr>
<tr>
<td>11) Dividende</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>12) Rentabilität</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13) Bruttomarge</td>
<td>22.61</td>
<td>22.46</td>
<td>22.17</td>
<td>22.19</td>
<td>17.53</td>
<td>90%</td>
<td>18.57</td>
<td>56.27</td>
<td>32%</td>
</tr>
<tr>
<td>14) Umsatzrendite</td>
<td>7.18</td>
<td>7.96</td>
<td>8.03</td>
<td>8.02</td>
<td>5.64</td>
<td>81%</td>
<td>6.24</td>
<td>9.13</td>
<td>30%</td>
</tr>
<tr>
<td>15) ROA</td>
<td>3.42</td>
<td>3.44</td>
<td>3.73</td>
<td>3.44</td>
<td>4.40</td>
<td>36%</td>
<td>5.89</td>
<td>1.57</td>
<td>52%</td>
</tr>
<tr>
<td>16) ROE</td>
<td>14.44</td>
<td>14.99</td>
<td>15.89</td>
<td>13.90</td>
<td>14.44</td>
<td>50%</td>
<td>15.33</td>
<td>16.92</td>
<td>30%</td>
</tr>
<tr>
<td>17) Risiko &amp; Ertrag</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18) Ges. Ertrag 1J</td>
<td>-17.56</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>10.35</td>
<td>19%</td>
<td>n/a</td>
<td>1.67</td>
<td>23%</td>
</tr>
<tr>
<td>19) Beta 2 J</td>
<td>0.87</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>0.69</td>
<td>64%</td>
<td>n/a</td>
<td>n/a</td>
<td>45%</td>
</tr>
</tbody>
</table>

Source: Bloomberg
Case study „BMW“: Peer-Group Scatter-Plot

Click on ticker to locate sphere
### Case study „BMW“: CCA Valuation with Microsoft Excel™

#### Peergroup

<table>
<thead>
<tr>
<th>Peergroup</th>
<th>Market Cap.</th>
<th>Enterprise Value</th>
<th>Sales</th>
<th>EBITDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daimler</td>
<td>51.627.130.000 €</td>
<td>117.053.200.000 €</td>
<td>151.589.000.000 €</td>
<td>16.587.000.000 €</td>
</tr>
<tr>
<td>Volkswagen</td>
<td>52.912.980.000 €</td>
<td>103.153.800.000 €</td>
<td>104.875.000.000 €</td>
<td>12.321.000.000 €</td>
</tr>
<tr>
<td>Audi</td>
<td>23.860.700.000 €</td>
<td>17.750.000.000 €</td>
<td>31.142.000.000 €</td>
<td>4.489.000.000 €</td>
</tr>
<tr>
<td>Porsche</td>
<td>19.162.320.000 €</td>
<td>26.167.390.000 €</td>
<td>7.367.880.000 €</td>
<td>5.337.210.000 €</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>36.890.782.500 €</strong></td>
<td><strong>66.031.097.500 €</strong></td>
<td><strong>73.743.470.000 €</strong></td>
<td><strong>9.683.552.500 €</strong></td>
</tr>
</tbody>
</table>

#### Multiples

<table>
<thead>
<tr>
<th>Multiples</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EV/Sales</td>
<td>0,90</td>
</tr>
<tr>
<td>EV/EBITDA</td>
<td>6,82</td>
</tr>
</tbody>
</table>
### Case study „BMW“: CCA Valuation with Microsoft Excel™

#### BWM

<table>
<thead>
<tr>
<th>Number of Shares</th>
<th>Sales</th>
<th>EBITDA</th>
<th>Short and Longterm Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>654,191,000</td>
<td>48,999,000,000 €</td>
<td>11,070,000,000 €</td>
<td>36,456,000,000 €</td>
</tr>
</tbody>
</table>

| Stock Exch. | 34,37 € | Difference |
| EV/Sales    | 11,34 € | -23,03 €   |
| EV/EBITDA   | 59,66 € | 25,29 €    |

#### Multiples

<table>
<thead>
<tr>
<th>Multiples</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV/Sales</td>
<td>0,90</td>
</tr>
<tr>
<td>EV/EBITDA</td>
<td>6,82</td>
</tr>
</tbody>
</table>
### Case study: Comparable Company Analysis BMW

#### DIVIDENDE DISKONT MODELL

<table>
<thead>
<tr>
<th>BMW GR</th>
<th>Bayerische Motoren Werke AG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gewinn/Aktie FY1</td>
<td>4.360</td>
</tr>
<tr>
<td>Gewinn/Aktie FY2</td>
<td>4.400</td>
</tr>
<tr>
<td>Gewinn/Aktie FY3</td>
<td>4.750</td>
</tr>
<tr>
<td>Dvd/Aktie FY1</td>
<td>0.997</td>
</tr>
<tr>
<td>Wachstumsjahre</td>
<td>0</td>
</tr>
<tr>
<td>Jahre bis Anpassung</td>
<td>8</td>
</tr>
<tr>
<td>Langfristige Wachstumsrate</td>
<td>5.925%</td>
</tr>
<tr>
<td>Schlusskurs</td>
<td>34.19</td>
</tr>
</tbody>
</table>

**Berechn. Werte basieren a.obigen Annahmen**

- Theoretischer Kurs: 26.76
- Proz. Änderung z. Schlusskurs: -26.48%
- Interner Zinsfuß (IRR): 10.28%
- Erwartete Rendite: -5.93%
- Impl. Wachstumsrate: 9.40%

Source: Bloomberg
3. Mergers & Acquisitions
3.1 The actors and their motives

3.1.1 Introduction

3.1.2 Conceptual delimitation
   3.1.2.1 Static
   3.1.2.2 Dynamic

3.1.3 Motives of the buyers
   3.1.3.1 Strategic motives
   3.1.3.2 Financial motives
   3.1.3.3 Personal motives

3.1.4 Motives of the sellers

3.1.5 The meaning of synergy potential
   3.1.5.1 Definition of „synergy“
   3.1.5.2 Forms of synergies

3.1.6 Traditional models of synergy evaluation
3.2 Takeover code (legal basis)
   3.2.1 Forms of financing
   3.2.2 Deal construction
   3.2.3 Share vs. Cash financing
   3.2.4 MBO / LMBO
   3.2.5 LBO
   3.2.6 MBI

3.3 Strategies of defence
   3.3.1 Introduction
   3.3.2 Motives for acquisitions
   3.3.3 Funding of acquisitions
   3.3.4 Measures of offence for the Raiders
   3.3.5 Measures of defence of the Target
   3.3.6 Barriers for Raids in Germany
3.4 Merger consultation: the example of DaimlerChrysler
3.4.1 Motives for mergers
3.4.2 Mergers of Equals
3.4.3 Forms of mergers
3.4.4 The merger of DaimlerChrysler
3.4.5 Appendix

3.5 RJ R Nabisco Case Study

3.6 Functions and Products of the Investment Bank within M&A
Alliances of businesses, like the merger of Mannesmann and the acquisition of AirTouch, are no phenomenon in the world of business.

- Already at the end of the 19th century, alliances, known under the name "trust movement", have been a common feature of the US-American economy.

- What is new is the increased importance of alliances, which is impressively shown in their increased number and dimension.
  - From 1990 until 1998, the global volume of transactions rose on an annual value basis of more than 20%.
  - With a value of 2.105 billion US-$, the volume of transactions went up to a level above the German GDP for the first time in 1998.
This development has clearly accelerated during the past years.

- Between 1991 and 1994, the value of the transaction volume increased only at around 16% per annum, whereas it increased at about 29% p.a. between 1995 and 1998.
- So, the speed of the "global Merger Activities" nearly doubled in the second half of the 90s.
- In addition to that, the number of the annual transactions more than doubled between 1990 and 1998, although the quantitative development clearly lagged behind the development of the value basis with around 9% p.a..
- Thus, the average transaction volume increased significantly between 1990 and 1998:
  - From 1995 until 1998, the average transaction volume increased at about 21% p.a. and reached an average volume per transaction of more than 100 mio. US-$ in 1998.
Against this background, we can note down that the significance of alliances has clearly increased both quantitatively and on a value basis in recent years. 

Not at least because of the increased number and the increased financial volume, the topic is enjoying great popularity in economic journals and newspapers.

In this connection, catch phrases such as „Elephant wedding“, „Acquisition battle“ etc. are used, whereas a standardised definition of the phrases is widely missed.

Additionally, the terminology is also not standardised in the business discussion about amalgamations.

Therefore, the main phrases will be precisely defined and delimited against each other in the following sections.
Under the requirement of the limitation of the economic independence of companies, there are two different forms of alliances.

- When the economic independence of the company is simply restricted, one can speak of **business cooperation**.
  - Examples of this form are, along with trade associations (Wirtschaftsverbänden) and cooperative societies (Genossenschaften), also 'strategic alliances' and 'Joint Ventures'.
- When the economic independence is not only restricted but completely abolished, one can speak of **business consolidation**.
3.1.2 Conceptual delimitation / 3.1.2.1 Static definition

- Whether you are talking about mergers or acquisitions is depending on the degree of legal entity of the involved companies after the alliance.
- In contrast to acquisitions, where the acquired company keeps its legal entity in general, mergers imply that at least one of the involved companies is losing its legal entity.
- If the acquired company gives up its legal entity and is integrated into the buying company, one can speak of „Merger by absorption“.
- Mergers, where both companies give up their legal entity to transform into a newly founded company, are called „Merger by establishment of a new company“.
From a dynamic point of view, a merger cannot only be regarded as a "status" but also as a "process".

Although there are several examples for process models of mergers in literature, there is no model which is universally valid.

It is only agreed on the fact that one can distinguish between a pre-merger-phase and a post-merger-phase according to the point of time when the contracts are signed.

- Ideally, the business objectives that should be realised are defined in the beginning of the pre-merger-phase.
  - Often, the objectives are formulated within the scope of a strategic business segment planning and also contain the assessment of mergers as a strategic option for action for the implementation of the formulated business objectives.
If the merging as a strategic option for action is found to be a positive solution for the realisation of the business objectives, criteria for the search of potential merger candidates are determined.

- These criteria can be both of quantitative nature (e.g. size of enterprise and turnover) and qualitative nature (e.g. product program and company culture).

- On the basis of the defined criteria, a „preference profile“ of the candidate can be created and the search can be started.

- If it is possible to identify appropriate candidates, the next step is to contact these companies, to conduct further analyses (Due Diligence) and to finally start negotiations.

- The end of the pre-merger-phase is reached with the conclusion of a contract.
The conclusion of the contract also presents the ideal start of the post-merger-phase.

In this phase, the main activity emphasis is – next to formal juristical activities (like the entry in the commercial register) – focused on measurements for the organisational connection of the companies.

- The activities during the post-merger-phase can be roughly divided into a **planning phase** and a **realisation phase**.
  - The planning phase typically serves as a preparation for the organisational connection and is therefore also called „stage setting phase“.
  - Visible result of the planning phase is the so-called “integration plan”, where main activities, responsibilities and other important issues within the framework of the organisational connection are defined.
- Regarding the timeframe of the planning phase, there is no standardized opinion in literature; according to situational influences, this phase might however last up to several months.
- The following realisation phase is in general characterised by the establishment of several project teams, which then carry out different tasks to reach the organisational connection of the involved companies.
- Therefore, the second post-merger-phase is also called “project phase”.
- The main activity emphasis in the realisation stage is the actual carrying out of the organisational connection according to the integration plan as established in the post-merger-phase.
The necessary need for consultation – which can be carried out by an investment bank – is determined by the motives of the involved companies.

In the following, the motives of the buyer and the seller of a company for the accomplishment of a M&A-transaction are considered to be the starting point for the consulting services of the investment bank.

Although the reasons for a M&A-decision are quite different from case to case, it is possible to distinguish between certain categories which can lead to M&A-transactions.

As possible categories on the buy side, there are strategic, financial and personal motivated acquisitions.

A choice of possible M&A-decisions is presented in the following figure.
3.1.3 Motives of the buyers

Mergers & Acquisitions

Motives for M&A

Strategic Motive
- Horizontal integration
  - Economies of Scale
  - Shake-out
- Vertical integration
  - Economies of Integration
- Lateral integration
  - Minimization of the costs of capital
  - Market entry

Financial Motives
- Under-valuation
- Fiscal design

Personal Motives
- Hybris-hypothesis
Motives of the buyers

Strategic motives M&A

- Strategic M&A are such transactions that express a corporate strategy. On the basis of the different kinds of acquisitions, they can be divided into horizontal, vertical and lateral integration.

- A horizontal integration, which means the amalgamation of a company in the same branch or production stage, is in general mainly directed towards two different aims:
  
  1. If the company taken over is integrated within the scope of a merger or as a subsidiary company in the long run, the transaction serves for the realisation of synergy potential.
    - Increased market shares promise greater market power, in the extreme case up to the building of monopolies.
Motives of the buyers

- In addition to that, there can be economies of scope or learning curves.
- Moreover, cost-savings might be aspired through agreements over the structures of purchasing, production, distribution and sales as well as through the merging of the general administration and the research and development activities („Economies of Scale“).
- In contrast to extreme growth with the help of horizontal integrations, growth can also be achieved internally through an expansion of the own capacities.
- Decision parameters that can lead to the choice of extreme growth can be existing barriers to entry or time restrictions, because internal growth needs much more time.
Mergers & Acquisitions

3.1.3 Motives of the buyers / 3.1.3.1 Strategic motives

- What is more, necessary R&D investments in some branches, e.g. memory chip and drug production, require a company size which can hardly be assured by internal growth.

- Against the background of the fast developments of the markets, it is often not a question whether a company is involved into a transaction but whether it appears as the buyer or the target.

(2) Alternatively, the acquired company can liquidate the assets of the target company within the scope of a separate sell out after the transaction.

- It is not aim of this strategy to realise synergies but to eliminate competition and to increase the own profitability through external and internal growth.
Mergers & Acquisitions

3.1.3 Motives of the buyers / 3.1.3.1 Strategic motives

- The amortisation revenues compensate the company taking over and can even exceed the purchase price in the individual case.

- Vertical acquisitions are takeovers of companies within the same branch that work in adjacent activities of the value chain. (I.e. they are concerned with either the inputs or outputs of the company)
  - Here, the realisation of synergies is the basis for the M&A decision, too.
  - Through the integration of distribution and sales channels, communication costs which arise from the lack of transparency of the adjacent markets can be reduced („Economies of Integration“).
  - In addition to that, the supply of input factors in the long run can be assured by the take over of suppliers.
Mergers & Acquisitions

3.1.3 Motives of the buyers / 3.1.3.1 Strategic motives

- So, the purchase of an oil-exporting company by a refinery ensures the supply with crude oil for the refinery.
- The same applies for the safeguarding of distribution channels, when later production stages or distribution companies are integrated.
- All in all, it is possible to attune larger areas of the value chain to each other more efficiently and therefore more profitable through vertical integration.
- Admittedly, the trend to integration along the value chain is restricted by increased costs for the administration of bigger company units.
- Furthermore, it has shown during the last few years, that deeper knowledge about the markets in which the company operates plays a major role for success.
3.1.3 Motives of the buyers / 3.1.3.1 Strategic motives

- As long as such core competences only exist for parts of the value chain, vertical integrations hold a high potential to be unsuccessful.

- A third form can be lateral acquisition (conglomerate mergers), which means the take over of a company working in another branch.
  - In addition to operative and strategic economies of scope, lateral acquisitions normally aim at synergies in the face of raising capital.
  - By acquiring companies from other branches, the company’s diversification of risk is increased.
  - This variance makes the profitability more consistence, which in turn decreases the return assumptions of the investors and therefore reduces the costs of finance of the whole enterprise.
Admittedly, this effect is often not satisfactorily shown in reality, as the example of the Daimler Benz AG demonstrates, whose lateral expansion efforts in the 80th has been flanked by increasing capital costs.

Nevertheless, lateral acquisition presents a possibility to ensure long-term survival by diversifying into new business areas especially for companies whose products are located in the degeneration phase of the product live cycle.
3.1.3 Motives of the buyers / 3.1.3.2 Financial motives

Financial motivated M&A

- While the motives for M&A-transactions that have been explained by now are located within the strategic business planning, there can also be pure financial reasons for M&A-transactions.

- Financially motivated M&A take place independently from the actual value chain of the company and are therefore not associated to a special form of acquisition in the sense of horizontal, vertical or lateral.

- The overall motive is only the realisation of additional short- and long-term profits.
3.1.3 Motives of the buyers / 3.1.3.2 Financial motives

- Usually, starting point of pure financially motivated transactions is the company evaluation in the market.
  - Therefore, they refer to listed companies, whose market value is located clearly under the estimations of the buyer, as well as to private companies, that are offered cheaply within the scope of for example a company succession.
  - The fundamental idea of this acquisition is based on an existing undervaluation of the target.
  - After the take over, the acquiring company eliminates the undervaluation by restructuring, additional acquisitions, mergers and sales on the level of the target company or by a change of management.
  - Sometimes, there can be a complete divestiture of the target and a following asset stripping, which means that the individual parts of the target are sold.
Mergers & Acquisitions

3.1.3 Motives of the buyers / 3.1.3.2 Financial motives

- Such a proceeding can be characterised as the removement of negative synergies, because the individual parts of the company are worth more than the whole company itself form the point of view of the share holders.
- Finally, the company concerned will be sold by the investor either via the stock exchange, which can involve a listing for private companies, or to a strategic investor within the scope of a trade sale.
- Moreover, the take over and following merger of companies with high accumulated tax deficits is widely used.
- Under the compliance with fiscal requirements for the utilisation of these accumulated deficits, extensive fiscal economisation potentials can be realised.
Motives of the buyers

3.1.3 Motives of the buyers / 3.1.3.3 Personal motives

Personal motives of the management

- In addition to the explained motives in the area of strategic corporate planning and financing, there are also different, especially psychological incentives for M&A.
- On the one hand, the planning and realisation of big acquisitions always needs some decision-makers who have the personal skills to bear the responsibility for this kind of decisions within the strategy of the company.
- On the other hand, the objectives of management and shareholders can diverge within a big company that practices a functional separation of equity and management.
Within the scope of the so-called “Agency-Theory”, the Hybris-Hypothesis comes in the fore concerning the problem of the purchase of a company. The comprehensible conclusion is, that take overs are (possibly predominantly) determined by personal aims of the management, which not necessarily match the objectives of the shareholders, like for example the increase of the own status with the help of higher sales volumes. Different empirical studies show that this kind of management behaviour has evident effects on the M&A activities of big companies.
From the point of view of the seller of a company, there are different kinds of (selling-) motives.

First of all, the crucial factor for a selling-decision especially for young companies might be the fact, that the young company alone cannot successfully realise its desired development to the full extend.

- By selling the company, the entrepreneur realises the value that had been created so far in the form of the sales revenue and is able to turn to a new activity.

In small- and medium-sized, family orientated businesses, it often comes to purchase intentions due to problems with the company succession because there is no internal successor for a retiring management personality within the family or the management.
3.1.4 Motives of the sellers

- In addition to that, companies or company divisions might be up for sale when the overall unit, e.g. the concern, wants to separate from an activity within the scope of a restructuring. Moreover, they might be up for sale because companies (or company divisions) need to be sold in the course of a bankruptcy proceeding.

- Except of these motives based in the pure private economy, there are also state-owned enterprises that are to be privatised and that therefore represent a part of the market for M&A.
  - The motives of the public authorities might differ from the motives of private enterprises, which is why they represent their own category of M&A.
  - Although the short-term relief of the public households is a common reason for disinvestment strategies, the predominant motives normally are regulatory objectives.
3.1.4 Motives of the sellers

- Special features of this kind of transactions are mostly the differing objectives of the state as a seller, which can be shown in choosing buyers under different aspects and making unusual contract conditions (which most of the time stems from protectional aims), as well as selling at a disadvantageous point of time.

- From the seller’s point of view, the alternative of a stock exchange introduction of company divisions has always to be borne in mind.

- The stock exchange introduction differs from a M&A transaction insofar as the a company sold in the course of a M&A transaction is sold only to one buyer and only at one point of time in contrary to an issuing of tranches over a longer period within the scope of a stock exchange introduction.

- The consultancy needed for a stock exchange introduction is therefore not task of the M&A division but it is normally task of the corporate finance division.
Meaning of synergy potential

To assess the result of a company take over to its greatest extend, the precise assessment of the single, positive as well as negative synergy potentials before the realisation of the transaction is crucial.

Companies that paid a good deal of attention to the synergy assessment before the alliance phase had a 28% better probability for a successful company amalgamation.

Definition of „synergy“:

- The etymological root is to be found in the Greek language and can be translated with „co-operating“ or „interworking“.
- Ansoff defined synergy as a company policy in which the overall performance is bigger than the sum of its single parts.
In a business context, the term „synergy“ is always used when the interaction or the combination of factors lead to a different, e.g. greater effect than the sum of the separated, independent reactions.

A positive synergy effect exists when the market value of two combined enterprises is greater than the sum of the single market values.

\[ V(a + b) > V(a) + V(b) \]

With the emphasise on superior, strategic aspects of company amalgamations, synergy effects are defined as changes of the collective, strategic success potentials of the parties involved through acquisitions.
Meaning of synergy potential

• In reference to efficiency and effectiveness respectively, synergies can be identified as soon as two company units work more efficiently (e.g. with lower costs) and/or more effective (e.g. in respect of the distribution of scarce resources).

• In the operational area, one speaks of synergies when with the help of the merger of company divisions, costs of certain activities or competences and experiences of key persons can be shared within the company.

• Acquisition based synergies are considered to be a possibility to increase the company value of one or more acquisition partners through a differed use of existing materials as well as human resources and the exploitation of the market potential on the supply and sales market of all acquisition partners.
Forms of synergies
Synergies can be classified on the basis of different ideas of synergies. In 1978, Ansoff divided the synergies related to the date of origin into synergy effects in the start-up phase (“Start-up Synergy”) and into synergies in the realisation phase (“Operating Synergy”).
Meaning of synergy potential

Due to the effect, Ansoff classified between:
- Sales Synergy, which created higher sales volumes.
- Operating Synergy, which lead to lower production costs.
- Investment Synergy, which reduce the average capital lockup.
- Management Synergy, which consist aspects of time.
About ten years later, Porter defined Synergies:

- **Material linkage**
  - Market linkage
  - Production linkage
  - Supply linkage
  - Technology linkage
  - Infrastructure linkage

- **Immaterial linkage**
  - Transfer of Management-Know-how
  - Special skills of related but separated value chains

- **Competitors linkage**
  - For each action, the whole spectrum of branches the alliance is in competition with as to be taken into account.
Moreover, there are the following ideas of synergies:

- **Weber**
  Differentiation of quantitative synergies between market orientated, cost orientated and fiscal synergy effects. Not quantifiable synergies are, according to Weber, the improvement of the image of the company or a better hedging on the supply and sales markets.

- **Damodaran**
  Synergies are to be understood as the potential added value of the alliance of two companies, divisible into operative and financial synergies.

- **Jansen**
  Grouping the synergy effects into „Economies of Scale“ and „Economies of Scope“. 
3.1.6 Traditional models of synergy evaluation

The model of Ansoff

- The first extensive evaluation model.
- Maximising factor is the “Return on Investment”
- Includes the Discount Cashflow as its measurement unit.
- Variables correspond to the sales synergies, the product synergies and the investment synergies.

Critic:
- Ansoff works with the Return on Investment as the dimension unit that has to maximised, but nowadays, the shareholder value is much more important.
3.1.6 Traditional models of synergy evaluation

\[ ROI_T = \frac{(S_T - O_T)}{I_T} \]

\[ S_T = \sum_{P=1}^{n} S_P \]

\[ S_T = \text{Overall turnover in the portfolio without synergy} \]

\[ O_T = \sum_{P=1}^{n} O_P \]

\[ O_T = \text{Overall manufacturing costs in the portfolio without synergy} \]

\[ I_T = \sum_{P=1}^{n} I_P \]

\[ I_T = \text{Overall investment in the portfolio without synergy} \]

\[ ROI_T = \text{Return on Investment in the portfolio without synergy} \]

\[ ROI_S = \text{Return on Investment in the portfolio with synergy} \]

\[ T = \text{Index for the completely diversified company as a whole} \]

\[ P = \text{Index for the single product} \]
3.1.6 Traditional models of synergy evaluation

Example:
The manufacturing costs will be lowered by alliance. So, the return on investment will change as follows:

$$S_S = S_T$$

$$O_S < O_T$$

$$I_S = I_T$$

From this follows:  $$ROI_S > ROI_T$$

Synergy = $ROI_S - ROI_T$
3.1.6 Traditional models of synergy evaluation

On the basis of Ansoff’s evaluation model, the following approach can be derived:

$$DCF_{Synergie} = \sum DCF_Z - (DCF_A + DCF_B)$$

$DCF_Z = DCF$ of the merged companies
$DCF_A = DCF$ of company A as an individual evaluation
$DCF_B = DCF$ of company B as an individual evaluation

⇒ As soon as the value of the alliance does not equal the sum of the values of the individual companies, there are either synergies that are positive or negative.
3.1.6 Traditional models of synergy evaluation

**The model of Fama/Jensen/Fisher/Roll**

- From the point of view of the shareholder value concept, acquisition success is only possible on the basis of the company’s market prices.
- Measurement of the influence of a certain event on the development of the share price.
- The model involves the so-called abnormal rate of return (the difference of the actual rate of return and the rate of return that would have been reached without the concerning event).

Basic formula: \( AR_{it} = Rit - E(R_{it}) \)

- \( AR_{it} \) = Abnormal rate of return of the share within the period \( t \)
- \( Rit \) = Actual rate of return of the share within the period \( t \)
- \( E(R_{it}) \) = Expected rate of return of the share within period \( t \)
3.1.6 Traditional models of synergy evaluation

Problem:
A model had to calculate the expected rate of return without the special event. Therefore, there Brown/Warner described different approaches:

1. **Mean Adjusted Returns**

   \[ AR_{it} = R_{it} - K_i \]

   \( K_i = \) Constant return of share \( i \)

   This model derives the abnormal return on the basis of past values by assuming that the previous performance can be transfused into the future, constant return.

2. **Market Adjusted Returns**

   \[ AR_{it} = R_{it} - R_{mt} \]

   \( R_{mt} = \) Market return within the period \( t \)

   In this model, the difference between the real return of the share and the overall market development.
3. Market and Risk Adjusted Returns

\[ E(R_{it}) = \alpha_i + \beta_i \times R_{mt} \]

- \( R_{mt} \) = Return of the stock market within the period \( t \)
- \( \alpha_i \) = Expectations parameter of the linear regression of the share \( i \).
- \( \beta_i \) = Expectations parameter of the linear regression of the share \( i \).

To use the model, several steps have to be fulfilled:

- Determination of the systematic risk \( (\beta_i) \), which presents the degree of impact the overall market influences have on the return of the analysed share.
3.1.6 Traditional models of synergy evaluation

- Calculation of the unsystematic return ($\alpha_i$), which is the difference of the return of the share in the specified period before the acquisition and the product of the systematic risk with the market return.
- Identification of the real return of the share by correcting the stock exchange price changes of the share with potential dividend.

$$AR_{it} = R_{it} - (\alpha_i + \beta_i \times R_{mt})$$

By summing up all accumulated returns, the accumulated abnormal return (AAR) is received.

$$KAR_{it} = \sum AR_{it}$$

When AAR is negative, the acquisition has led to a reduction of shareholder value.

Alternative: Capital Asset Pricing Model
3.1.6 Traditional models of synergy evaluation

**The model of Damodaran**

Creation of a questionnaire to evaluate synergies, which is made plausible by its steps of synergy-evaluation.

The model is interesting in practise because the questionnaire can be inserted into a spreadsheet program (e.g. Excel) to show different scenarios.

This model is based on the „Discounted Cashflow“-method.

Steps to evaluate synergies:

1. Separate evaluations of the two companies with the planned cashflows.

2. Evaluation of the alliance without consideration of synergy effects that occur due to the addition of the results from step 1.
3.1.6 Traditional models of synergy evaluation

3. Preparation of a cashflow-statement with consideration of the data from the questionnaire.

- Assessment of the causes of the synergy (higher growth of the sales volume, etc.).

5. Quantification of the synergy effect in the cashflow-statement of the alliance.

6. Assessment of the alliance with the modified results from step 5.

7. Comparison of the calculated company values with consideration of synergies with the results from step 2. The difference between these two results is the value of the synergy. At the same time, it is the value of the award that has to be paid.
3.1.6 Traditional models of synergy evaluation

**Example:**

<table>
<thead>
<tr>
<th>Information</th>
<th>Acquiring company</th>
<th>Target company</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Present data-framework</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales volume</td>
<td>€ 1,000,00</td>
<td>€ 800,00</td>
</tr>
<tr>
<td>Operative expenses in % of the sales volume</td>
<td>70,00%</td>
<td>75,00%</td>
</tr>
<tr>
<td>(Incl. amortisation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tax rate on the taxable income</td>
<td>35,00%</td>
<td>35,00%</td>
</tr>
<tr>
<td>Interest expenditures</td>
<td>€ 100,00</td>
<td>€ 100,00</td>
</tr>
<tr>
<td>Amortisation</td>
<td>€ 50,00</td>
<td>€ 75,00</td>
</tr>
<tr>
<td>Investments</td>
<td>€ 75,00</td>
<td>€ 100,00</td>
</tr>
<tr>
<td>Floating assets in % of the sales volume</td>
<td>5,00%</td>
<td>5,00%</td>
</tr>
<tr>
<td><strong>Expected growth of profits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected growth rate within the next 5 years</td>
<td>15,00%</td>
<td>20,00%</td>
</tr>
<tr>
<td>Expected growth rate after the next 5 years</td>
<td>6,00%</td>
<td>7,00%</td>
</tr>
<tr>
<td><strong>Risk index</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta of the share</td>
<td>1,10</td>
<td>1,25</td>
</tr>
</tbody>
</table>
3.1.6 Traditional models of synergy evaluation

General information about the acquiring company:

Risk-free rate of return: 6,00%; Risk premium: 5,50%

<table>
<thead>
<tr>
<th>Information regarding the synergy effects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>What kind of synergies are generated?</td>
<td></td>
</tr>
<tr>
<td>1: Cost reduction;</td>
<td>2: Cost reduction and an increase of the growth rate;</td>
</tr>
<tr>
<td>Weighted operative expenditure without consideration of the synergies</td>
<td>72,22%</td>
</tr>
<tr>
<td>Weighted operative expenditure with consideration of the synergies</td>
<td>-</td>
</tr>
<tr>
<td>Expected growth of turnover within the next 5 y. without consideration of the synergies</td>
<td>16,26%</td>
</tr>
<tr>
<td>Expected growth of turnover within the next 5 y. with consideration of the synergies</td>
<td>20,00%</td>
</tr>
<tr>
<td>Expected growth of turnover after the next 5 y. without consideration of the synergies</td>
<td>6,30%</td>
</tr>
<tr>
<td>Expected growth of turnover after the next 5 y. with consideration of the synergies</td>
<td>7,00%</td>
</tr>
</tbody>
</table>
### 3.1.6 Traditional models of synergy evaluation

<table>
<thead>
<tr>
<th></th>
<th>Acquirer</th>
<th>Target company</th>
<th>A+B: without synergies</th>
<th>A+B: with synergies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Free Cashflow</strong></td>
<td>€ 98,49</td>
<td>€ 33,33</td>
<td>€ 131,81</td>
<td>€ 131,81</td>
</tr>
<tr>
<td>(without consideration of debt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Expected growth rate</strong></td>
<td>15%</td>
<td>20%</td>
<td>16,26%</td>
<td>20,00%</td>
</tr>
<tr>
<td>within the next 5 y.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Expected growth rate</strong></td>
<td>6%</td>
<td>7%</td>
<td>6,3%</td>
<td>7,00%</td>
</tr>
<tr>
<td>after the next 5 y.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Beta</strong> (with the results from A a. B weighted)</td>
<td>1,10</td>
<td>1,25</td>
<td>1,14</td>
<td>1,14</td>
</tr>
<tr>
<td><strong>Capital costs</strong></td>
<td>12,05%</td>
<td>12,88%</td>
<td>12,29%</td>
<td>12,29%</td>
</tr>
<tr>
<td><strong>Risk-free interest rate</strong></td>
<td>6,00%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 3.1.6 Traditional models of synergy evaluation

With the help of the available information, the company value of the alliance and therefore the value of the synergy effect can be calculated:

<table>
<thead>
<tr>
<th>Year</th>
<th>FCF (A)</th>
<th>Final value (A)</th>
<th>FCF (B)</th>
<th>Final value (B)</th>
<th>FCF (A+B)</th>
<th>Final value (A+B)</th>
<th>FCF (A+B) with S.</th>
<th>Final value (A+B) with S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>€113,25</td>
<td>€40,00</td>
<td></td>
<td></td>
<td>€153,25</td>
<td></td>
<td></td>
<td>€158,17</td>
</tr>
<tr>
<td>2</td>
<td>€130,24</td>
<td>€48,00</td>
<td></td>
<td></td>
<td>€178,24</td>
<td></td>
<td></td>
<td>€189,81</td>
</tr>
<tr>
<td>3</td>
<td>€149,77</td>
<td>€57,60</td>
<td></td>
<td></td>
<td>€207,37</td>
<td></td>
<td></td>
<td>€227,77</td>
</tr>
<tr>
<td>4</td>
<td>€172,24</td>
<td>€69,12</td>
<td></td>
<td></td>
<td>€241,36</td>
<td></td>
<td></td>
<td>€273,32</td>
</tr>
<tr>
<td>5</td>
<td>€198,07</td>
<td>€3.470,40</td>
<td>€82,94</td>
<td>€1.510,64</td>
<td>€4.981,04</td>
<td>€327,99</td>
<td>€6.634,01</td>
<td></td>
</tr>
<tr>
<td>Capital value</td>
<td>€2.497,48</td>
<td>€1.025,48</td>
<td>€3.523,56</td>
<td>€4.523,83</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Value of the synergy**: €1.000,27
- **Maximum purchase price**: €2.025,74
- **% premium above the market price**: 97,54%
3.1.6 Traditional models of synergy evaluation

The model of Kerler

- Different assumptions regarding free cash flows, capital costs and growth rate have to be made.
- Quantification of the planning values regarding the different kinds of synergies
- Evaluation of the expected synergies with the extended DFCF ("Discounted Free Cash-flow")-evaluation
  1. Independent assessment of the acquisition partners by discounting the expected cash flows with the particular WACC of the company.
  2. Identification of the values of the alliance without consideration of the synergies.
  3. Identification of the modified values of the expected cash flow by considering the impact of the potential synergy effects.
3.1.6 Traditional models of synergy evaluation

**The model of Kerler**

4. The explicit synergy value is calculated by forming the difference between the value of the alliance with consideration of the synergies and the value of the alliance without consideration of the synergies.

<table>
<thead>
<tr>
<th></th>
<th>Company A</th>
<th>Company B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>€ 10.000 Mio.</td>
<td>€ 5.000 Mio.</td>
</tr>
<tr>
<td>/. costs</td>
<td>Production</td>
<td>Production</td>
</tr>
<tr>
<td></td>
<td>€ 8.000 Mio.</td>
<td>€ 3.500 Mio.</td>
</tr>
<tr>
<td>EBIT</td>
<td>€ 2.000 Mio.</td>
<td>€ 1.500 Mio.</td>
</tr>
<tr>
<td>Expected growth rate</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>(g)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital costs (k)</td>
<td>9%</td>
<td>10%</td>
</tr>
</tbody>
</table>
3.1.6 Traditional models of synergy evaluation

Free Cash flow company = EBITx(1-tax rate von 33%)
Free Cash flow company A = 2.000x(1-0,33) = 1.340
Free Cash flow company B = 1.500x(1-0,33) = 1.005

„Stand Alone“-Value:
Value of the company = \( FCF \times \frac{1 + g}{k - g} \)
Value of the company A = \( 1.340 \times \frac{1,04}{0,09 - 0,04} = 27.872 \)
Value of the company B = \( 1.005 \times \frac{1,06}{0,1 - 0,06} = 26.633 \)

Value of the alliance without synergy = 54.505
Capital costs of the alliance:
\[ = 9\% \times \frac{27.872}{(27.872 + 26.633)} + 10\% \times \frac{26.633}{(27.872 + 26.633)} \approx 9,5\% \]
Expected growth rate of the alliance

\[
4\% \times \frac{27.872}{(27.872 + 26.633)} + 6\% \times \frac{26.633}{(27.872 + 26.633)} \approx 5\%
\]

Calculated value of the different kinds of synergies:
- Due to the acquisition, the competition within the sales market is reduced and market power is created; increase of the turnover: about 1%.
- Organisational synergies for the production make it possible for the company to reduce its production costs about 3%.
- Management synergies make a rise of the growth rate from 5% to 5.2% possible by optimising the investment politics.
- Finance synergies allow for a reduction of capital costs from 9.5% to 9.25%.
Consequently:

<table>
<thead>
<tr>
<th></th>
<th>Alliances without synergies</th>
<th>Alliances with synergies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>€ 15.000 Mio.</td>
<td>€ 15.150 Mio.</td>
</tr>
<tr>
<td>Production costs</td>
<td>€ 11.500 Mio.</td>
<td>€ 11.155 Mio.</td>
</tr>
<tr>
<td>EBIT</td>
<td>€ 3.500 Mio.</td>
<td>€ 3.883 Mio.</td>
</tr>
<tr>
<td>Expected growth rate</td>
<td>5,0%</td>
<td>5,2%</td>
</tr>
<tr>
<td>Capital costs</td>
<td>9,5%</td>
<td>9,25%</td>
</tr>
<tr>
<td>Company value</td>
<td>€ 54.717 Mio.</td>
<td>€ 69.527 Mio.</td>
</tr>
</tbody>
</table>

3.1.6 Traditional models of synergy evaluation

**The model of Brealey/Myers**

The increase of the company value with the help of synergy effects comes to the fore.

Determination of the added value that is generated by the fusion of the companies A and B:

\[ \text{Mehrwert} = PV_{AB} - (PV_A + PV_B) = \Delta PV_{AB} \]

\( PV_{AB} \) = Present Value of the alliance

\( PV_A \) = Present Value of company A

\( PV_B \) = Present Value of company B

Positive added value = economical justification of the company acquisition. However, costs are not included. Payment is made in cash, so that the costs can be calculated by subtracting the PV from the real payment.

Costs = Cash - \( PV_B \)
3.1.6 Traditional models of synergy evaluation

**The model of Brealey/Myers**

The NPV is calculated with the difference between the added value and the costs. The acquisition should only be implemented if the NPV is positive:

\[
\text{NPV} = \Delta PV_{AB} - (\text{Cash} - PV_B) \Rightarrow \text{positive !}
\]

\[
\text{NPV} = \text{Net Present Value}
\]

\[
\Delta PV_{AB} = \text{The added value generated by the merger.}
\]
3.1.6 Traditional models of synergy evaluation

**The model of Brealey/ Myers**

Example:

Company A is worth € 200 mio. and company B is worth € 50 mio. The combination of the two companies would allow for cost reductions of € 25 mio.

\[ PV_A = € 200 \quad \text{Added Value} = \quad \Delta PV_{AB} = + € 25 \]
\[ PV_B = € 50 \quad PV_{AB} = € 275 \]

Assumption: Company B is bought for € 65 mio. in cash.

Costs = Cash – PV_B = € 65 - € 50 = € 15
3.1.6 Traditional models of synergy evaluation

**The model of Brealey/ Myers**

Share holders of company B earn € 15 mio. by the sale, so that the costs of company A represent the gain of company B.

€ 15 mio. of the overall value of € 25 mio. flow to the seller.

NPV reflects the value that the share holders of company B will achieve.

\[ \text{NPV} = \text{€ 25} - \text{€15} = \text{€ 10} \]

NPV = Value of the fusion – Value without fusion
3.2 Purchase price financing for M&A transactions
3.2 **Purchase price financing for M&A transactions**

3.2.1 Overview of financing forms
3.2.2 Deal constructions
3.2.3 Share vs. Cash Financing
3.2.4 MBO / LMBO
3.2.5 LBO
3.2.6 MBI
**Mergers & Acquisitions**

3.2.1 Overview of financing forms

- **MBO (Management Buy Out):** Buy Out at which the management acquires shares of the company.
- **LMBO (Leveraged Management Buy Out):** A MBO which is mostly financed by debt capital.
- **LBO (Leveraged Buy Out):** Is equivalent to a LMBO, but without any acquisition by the management.
- **MBI (Management Buy In):** Pro rata acquisition of the company by an external group of future managers.
- **Spin Off:** Separation and restructuring of company parts to work independently. Outsourcing and sale of assets.
- **Expansion-Buy Out:** Acquisition of a company, which corresponds to the groups strategy.
- **Special forms:** EBO (Employee Buy Out), OBO (Owner Buy Out).
3.2.2 Deal Constructions
Asset Deal and Share Deal

- **Asset Deal**: This construction is characterised by the acquisition of all assets and the adoption of all liabilities of the target.
  ⇒ Advantageous for the buyer, as he has the possibility to amortise the assets as well as the goodwill.

- **Share Deal**: Here, the accounting of all assets and all liabilities is carried out in the buyer's balance. In case purchase price > actual cash value of assets – actual cash value of liabilities, there is an option for capitalisation of the difference (Goodwill), in which the goodwill has to be amortised over at least four years.

On the next slide there is a simplified illustration of an asset deal.

⇒ Advantageous for the seller because of liability reasons (transmission of all liabilities, diminution of the tax burden).
3.2.2 Deal Constructions

**Asset Deal**

- **Equity investors**
- **Seller**
- **Newco (New Company)**
- **Debt Capital Investors**

**Key Components:**
- Purchase price
- Loans
- Liabilities
- Assets
- Securities for debt capital

**Target**

---

**Mergers & Acquisitions**

---

Seite 66
Due to the different interests on the part of seller and buyer, the following alternatives to these Deal Constructions have been created:

- **Combination model**: Creation of a Newco by the buyer. Acquisition of shares from the seller by Newco and acquisition of the affiliate company’s assets at current market value (capitalisation and amortisation of inner reserves at Newco is possible). Payout of the capital gain to Newco and in the same amount amortisation on the participation.

- **Conversion model**: Foundation of the acquisition company as a business partnership. Acquisition of parts of the target through the acquirer. Consolidation of the target and the acquirer. Maybe conversion of the acquirer into a capital company.
3.2.3 Stock vs. Cash Financing
3.2.3 Stock vs. Cash Financing

Stock versus Cash Financing

- The financing of acquisitions takes place either by cash payment or by shares exchange. The vital difference between these two financing forms lies in the risk analysis. While with cash payment the risk of an overestimation of the synergy potentials and thus an eventual excessive acquisition prize is carried exclusively by the buyers' shareholders, with a share exchange this risk is carried by the targets' shareholders also.

- During the last years the Stock Financing model became widely accepted.
3.2.3 Share vs. Cash Financing

The Popularity of Paper
Percentage of total value of deals

Percentage of total number of deals

- All cash
- All stock

Share vs. Cash Financing
3.2.3 Share vs. Cash Financing

Fixed Shares

- In the case of a share exchange, the buyer can either choose a fixed number of shares (Fixed Shares) or a fixed purchase prize (Fixed Value).
- In the first case, the exchange ratio of the stocks is known but the prize is not known because this depends on the chart-development of the acquirer's shares between the announcement and the closing of the deal. Consequently both the shareholders of the buyer and the shareholders of the target are exposed to the chart-development of the buyer's shares.
The shareholders of GTF replace their shares with 0.9165 shares of Conseco.

At the 6 April 1998, the day of the announcement of the deal, Conseco quoted $ 57.75 per share. For the shareholders, this implied that they obtained a value of $ 53 for each GTF share in units of the Conseco shares.

Because the GTF share price was $ 29 per share before the announcement, this implied a premium of 83%.

In difference to the positive assessment of the synergy potential on the part of Conseco, the market always emphasised the risks of this deal. So, the volume of this deal is 8-times higher than the volume of the biggest deal Conseco ever implemented.

Example: Acquisition of Green Tree Financial by Conseco

- The shareholders of GTF replace their shares with 0.9165 shares of Conseco.
- At the 6 April 1998, the day of the announcement of the deal, Conseco quoted $ 57.75 per share. For the shareholders, this implied that they obtained a value of $ 53 for each GTF share in units of the Conseco shares.
- Because the GTF share price was $ 29 per share before the announcement, this implied a premium of 83%.
- In difference to the positive assessment of the synergy potential on the part of Conseco, the market always emphasised the risks of this deal. So, the volume of this deal is 8-times higher than the volume of the biggest deal Conseco ever implemented.

Mergers & Acquisitions

3.2.3 Share vs. Cash Financing

Share vs. Cash Financing
In addition to that, the deal was conceived more as a step into the direction of a diversification strategy, so that there has been some doubts about the PVEA—especially regarding the development of the present core competences of Conseco.

At the time of the deal, the share price of Conseco was $53 per share, so that the shareholders of GTF only obtained a value of $44 per share of their GTF shares.

Therefore, the premium reduced from 83% to 52%.

In April 1999, one year after the deal, the share price of Conseco was $30 per share, which only represented a premium of $1.5 per share above the previous price before the first announcement of the acquisition.
3.2.3 Share vs. Cash Financing

Fixed Value

- In this case, the purchasing price, but not the exchange ration at the time of the announcement of the deal, is fixed. Therefore, the acquirer has to bear the whole price risk in the period between the announcement and the completion of the deal.
- Thus, the acquirer is forced to implement an increase in share capital in the case of declining share prices.
- In consequence of the dilution, shareholders of the acquirer have a smaller stake in the merged company and consequently also in the expected synergy potentials.
- The practice of M&As shows, that this risk is often not considered by companies calculating the synergy potential.
Questions of the acquirer and the seller

- Caused by the central meaning the nature of the payment has for the assessment of the acquisition, both the management and the board of directors of the acquirer as well as the seller should carefully look into the following questions:

- Questions of the acquirer:
  - Are the shares of the target undervalued, overvalued or fairly valued?
  - How has the risk to be assessed that the synergy potential needed to legitimate the purchase price might not realised?
  - How has the risk to be assessed that our shares fall before the completion of the deal?

- Questions of the seller:
  - What is the value of the acquirer?
  - What is the likelihood that the expected synergy potentials are not realised?
  - What is the Preclosing Market Risk?
### How risk is distributed between Acquirer and Seller

<table>
<thead>
<tr>
<th>Merger Type</th>
<th>Preclosing market risk</th>
<th>Postclosing operating risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All-Cash Deal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquirer</td>
<td>all</td>
<td>all</td>
</tr>
<tr>
<td>Seller</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Fixed-Share Deal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquirer</td>
<td>Expected percentage of ownership</td>
<td>Actual percentage of ownership</td>
</tr>
<tr>
<td>Seller</td>
<td>Expected percentage of ownership</td>
<td>Actual percentage of ownership</td>
</tr>
<tr>
<td><strong>Fixed-Value Deal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquirer</td>
<td>all</td>
<td>Actual percentage of ownership</td>
</tr>
<tr>
<td>Seller</td>
<td>none</td>
<td>Actual percentage of ownership</td>
</tr>
</tbody>
</table>
SVAR (Shareholder Value at Risk)

- If the expected synergies, that are included in the premium, do not realise, both parties have to consider the effects on the particular shareholder value.
- There are two possibilities to measure the risk of the synergy, one for the acquirer and one for the seller.
- For the seller, the risk can be assessed with the help of the SVAR. Therefore, the SVAR is defined as follows:

\[
SVAR = \frac{\text{Premium}}{\text{Market value of the acquirer}}
\]

**or**

\[
SVAR = \text{percentage} \times \frac{\text{Premium}}{\frac{\text{Market value of the seller}}{\text{Market value of the acquirer}}}
\]
3.2.3 Share vs. Cash Finanzierung

Premium at Risk

• A variation of the SVAR, the *premium at risk*, can help the shareholders of the seller to determine the risk when no synergies at all are realised.

• The question for the seller is: Which percentage of the premium is endangered at an offering of shares?
  The answer is: The percentage of the equity that the seller owns on the merger.
The bigger the percentage premium that is paid to the seller and the bigger the relative market value is, the bigger is the SVAR.

It is possible that the acquirer is losing more than his premium. In these cases, the risk is underestimated by the SVAR.

### Share vs. Cash Financing

<table>
<thead>
<tr>
<th>Premium</th>
<th>Relative Size of the Seller to the Acquirer</th>
</tr>
</thead>
<tbody>
<tr>
<td>30%</td>
<td>0,25, 7,5%, 15%, 22,5%, 30%</td>
</tr>
<tr>
<td>40%</td>
<td>0,5, 10%, 20%, 30%, 40%</td>
</tr>
<tr>
<td>50%</td>
<td>0,75, 12,5%, 25%, 37,5%, 50%</td>
</tr>
<tr>
<td>60%</td>
<td>1,0, 15%, 30%, 45%, 60%</td>
</tr>
</tbody>
</table>
### SVAR and Premium at Risk for Major Stock Deals 1998

<table>
<thead>
<tr>
<th>Acquirer</th>
<th>Seller</th>
<th>Premium</th>
<th>Relative Size of the Seller to the Acquirer</th>
<th>Cash SVAR</th>
<th>Acquirer’s Proportional Ownership</th>
<th>Stock SVAR</th>
<th>Seller’s Premium at Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>McKesson-Robbins</td>
<td>HBO &amp; Co.</td>
<td>30%</td>
<td>1,41</td>
<td>42%</td>
<td>37%</td>
<td>16%</td>
<td>63%</td>
</tr>
<tr>
<td>Tyco International.</td>
<td>AMP</td>
<td>66%</td>
<td>0,18</td>
<td>12%</td>
<td>78%</td>
<td>9%</td>
<td>22%</td>
</tr>
<tr>
<td>Halliburton</td>
<td>Dresser Industries</td>
<td>15%</td>
<td>0,58</td>
<td>9%</td>
<td>60%</td>
<td>5%</td>
<td>40%</td>
</tr>
<tr>
<td>Household Internation.</td>
<td>Beneficial</td>
<td>82%</td>
<td>1,01</td>
<td>83%</td>
<td>63%</td>
<td>52%</td>
<td>37%</td>
</tr>
<tr>
<td>Conseco</td>
<td>Green Tree Financial</td>
<td>83%</td>
<td>0,39</td>
<td>32%</td>
<td>60%</td>
<td>19%</td>
<td>40%</td>
</tr>
<tr>
<td>Office Depot</td>
<td>VikingOffice Products</td>
<td>42%</td>
<td>0,63</td>
<td>26%</td>
<td>63%</td>
<td>16%</td>
<td>37%</td>
</tr>
</tbody>
</table>

**Share vs. Cash Financing**
Avoid making acquisitions on the basis of your valuation error. Focus on valuing the synergy.

Don't bid for a firm if it is worth more to others than to you. (Even if you win, you lose)

Don't acquire firms because they are in growth areas. Acquire firms that are worth more in your hands.

Don't acquire low P/E firms because they are cheap. About half aren't.

Don't sell off a division because it is unprofitable. Do so because it is worth more to the other firm.

Don't pay too much for assets that go down in the elevator & into the parking lot every evening.
### Share Market Reactions on Mergers in the Seventies

#### UK

<table>
<thead>
<tr>
<th>Month</th>
<th>Targets</th>
<th>Acquirer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>24%</td>
<td>1%</td>
</tr>
<tr>
<td>-4 to +1</td>
<td>31%</td>
<td>8%</td>
</tr>
</tbody>
</table>

#### USA

<table>
<thead>
<tr>
<th>Month</th>
<th>Targets</th>
<th>Acquirer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16%</td>
<td>1%</td>
</tr>
<tr>
<td>-4 to +1</td>
<td>24%</td>
<td>4%</td>
</tr>
</tbody>
</table>
While the targets AAR is clearly positive, it is only slightly positive for the acquirer.

Days before and after the first press release

Source: Asquith (1983)

Share vs. Cash Financing
Reasons for negative capital market reactions of the acquirer on M&A's

While for the targets high AAR are observable also during the eighties and nineties, for the acquirer backwardations at the moment of deal-announcement were observed in 2/3 of the analysed cases in 1999. The reasons of this are:

- The premium paid (It averages at about 30-40% over the market value before the first press day) turns out to high in comparison to the present value of the (universal and specific) synergy potential. This is all the more serious, as the PVEA (Present Value of Existing Assets) represents merely 20-40% of the current share price. According to this, even without an acquisition 60-80% PVGO (Present Value of Growth Opportunities) are included in the current share price. When in addition to this an acquisition premium of averaged 30-40% is paid on the current market price, the current share price is in a decreasing extent represented by the PVEA. This is in so far problematic, as often resources are detracted from the core area (and thus the existent EPS is negatively affected) to realise synergy potential from the deal later.
Mergers & Acquisitions

Reasons for negative capital market reactions of the acquirer on M&A's (2)

– Promised synergy potential indeed leads to a competitive advantage, but this is only temporally and duplicated by the competitors before long. In addition, organizational restructuring measures can occur in the course of (specially Cross-Border) M&A’s, which cause inter alia the adjustment of the salary-structures of the two companies (see Deutsche Bank/Bankers Trust).

– Unlike investments as R&D, addition to capacity, marketing strategies, etc. for which payments can be effected in tranches or may be delayed, payments always incur directly for M&A’s.

⇒ thus in acquisitions, the financial clock starts ticking on the entire investment right from the beginning.

– Thus shareholders will sell their shares of the bidder just before the date of integration, if they have doubts about a quick integration of the two companies.
The purchase price of a M&A target is often exclusively determined by a “Comparable Acquisition Analysis (CAA) without analysing the Stand Alone Value or evaluating the synergy potential. As a result the paid price often does not represent the value added of the acquisition for the acquirer.

If finally M&As fail, there is the problem of restructuring by selling the company part. In this situation it is problematic, that managers who normally manage the company portfolio based on Value Mapping are reluctant to implement desinvestment strategies. Quite the contrary, it is not unusual that they implement investment strategies and waste a lot of money in the hope that everything will turn to a good account if only enough money is invested in this area.
3.2.4 MBO / LMBO
### Kriterien zur MBO-Eignung

<table>
<thead>
<tr>
<th>Product-related criteria</th>
<th>Technically mature products with well-known labels, no technological leap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Products in maturity of their life cycle</td>
</tr>
<tr>
<td></td>
<td>Products in markets of slow technological development</td>
</tr>
<tr>
<td></td>
<td>Long product life cycles</td>
</tr>
<tr>
<td></td>
<td>Low number of products in earlier stages of the product life cycle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Market-related criteria</th>
<th>Affiliation to industry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stable market position with high relative market share</td>
</tr>
<tr>
<td></td>
<td>Largely stable demand on stable markets</td>
</tr>
<tr>
<td></td>
<td>Low competitive intensity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Management- and staff-related criteria</th>
<th>Experienced and qualified management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Personal ability of the management to work under pressure and familial support</td>
</tr>
<tr>
<td></td>
<td>Good work climate without any problems with the works council or the labor union</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial criteria</th>
<th>Stable, well-predictable cash flow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low debt-equity ratio</td>
</tr>
<tr>
<td></td>
<td>Large lendable assets</td>
</tr>
<tr>
<td></td>
<td>High quota of disposable assets</td>
</tr>
<tr>
<td></td>
<td>High inventory turnover</td>
</tr>
<tr>
<td></td>
<td>Low intensity of investments</td>
</tr>
<tr>
<td></td>
<td>High investory turnover</td>
</tr>
</tbody>
</table>
Criteria for MBO-companies

Criteria

Financial figures
- Cash Flow
- dynamic
- debt-equity ratio
- Effective level of debt intensity of investments

Strategic factors
- Competitive intensity
- Competitive strength
- Position in the market life cycle
- Portfolio-Matrix-position

General criteria
- stability of returns
- assets
- purchase price
- growth rate
- Season cycle
3.2.4 MBO / LMBO

**Reasons for a MBO**

- Spin-offs due to restructuring measures in conglomerates
- Succession solutions for medium-sized companies
- Going-Private
- Insolvency/Reorganisation
### Financing forms for a MBO

<table>
<thead>
<tr>
<th>Financing forms in %</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>(for company-capital-MBO over 10 Mio. pound)</td>
<td></td>
</tr>
<tr>
<td>Debt (prior debt)</td>
<td>55,4</td>
</tr>
<tr>
<td>Equity (capital brought in by the management)</td>
<td>25,0</td>
</tr>
<tr>
<td>Mezzanine (subordinated debt)</td>
<td>10,5</td>
</tr>
<tr>
<td>Loan Note (discount credit)</td>
<td>6,4</td>
</tr>
<tr>
<td>Others</td>
<td>2,7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100,0</td>
</tr>
</tbody>
</table>
3.2.4 MBO / LMBO

Effects of MBO’s

- Introduction of new innovations and products
- Changes in the organisational structure
- Improved profitability in over 50% of all cases
- A strong reduction of staff in the beginning is followed by the creation of new jobs
- Relations to customers, suppliers, and labour unions degrade only marginally
An internal buyout-team aims at taking the company over.

The purchase price amounts to 50 mio. EUR.
- 10 Mio. as capital brought in by the management,
- 5 Mio. as subordinated debt and
- 35 Mio. as bank loan.

The Free Cash-Flow is completely used for the amortisation of the LBO-credit amounting to 35 Mio..

The financial plan with a medium-term maturity looks as follows:
### 3.2.4 MBO / LMBO

#### MBO-case study II

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual result before LBO-credit interest</td>
<td>-</td>
<td>5,0</td>
<td>6,0</td>
<td>6,0</td>
<td>7,0</td>
<td>7,0</td>
</tr>
<tr>
<td>Annual result after credit interest</td>
<td>5,0</td>
<td>2,8</td>
<td>3,8</td>
<td>4,0</td>
<td>5,3</td>
<td>5,5</td>
</tr>
<tr>
<td>+ amortisation</td>
<td>3,0</td>
<td>3,0</td>
<td>4,0</td>
<td>5,0</td>
<td>4,0</td>
<td>4,0</td>
</tr>
<tr>
<td>+provisions</td>
<td>1,0</td>
<td>1,0</td>
<td>1,0</td>
<td>1,0</td>
<td>1,0</td>
<td>1,0</td>
</tr>
<tr>
<td>Intermediate result</td>
<td>9,0</td>
<td>6,8</td>
<td>8,8</td>
<td>10,0</td>
<td>10,3</td>
<td>10,5</td>
</tr>
<tr>
<td>- Investment</td>
<td>3,0</td>
<td>5,0</td>
<td>5,0</td>
<td>4,0</td>
<td>4,0</td>
<td>4,0</td>
</tr>
<tr>
<td>- Changes of the working capital</td>
<td>1,0</td>
<td>1,0</td>
<td>1,0</td>
<td>1,0</td>
<td>1,0</td>
<td>1,0</td>
</tr>
<tr>
<td>- Free Cash Flow</td>
<td>-</td>
<td>0,8</td>
<td>2,8</td>
<td>5,0</td>
<td>5,3</td>
<td>5,5</td>
</tr>
<tr>
<td>Liable LBO-credit</td>
<td>35,0</td>
<td>34,2</td>
<td>31,4</td>
<td>26,4</td>
<td>21,1</td>
<td>15,6</td>
</tr>
</tbody>
</table>
Thus after five years 55 % of the liable amount can already be amortised.

If for 1994 a hypothetical purchase price of the target of 55 mio. EUR, less the remaining credit of 15.6 mio. EUR and the subordinated debt of 5 mio. EUR is expected, the company has a residual value of 34.4 mio. EUR.

In the case of a realisation of the planned results a MBO- structuring would generate for the management a yield of 28% p.a. after five years.
### MBO / LMBO

**Interrelation of MBO vs. LBO**

<table>
<thead>
<tr>
<th>Financing form</th>
<th>Moderate debt ratio</th>
<th>Traditional acquisition</th>
<th>MBO in the broadest sense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Externs</td>
<td>Traditional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High debt ratio</td>
<td>LBO</td>
<td>LMBO / MBO in the closer sense</td>
<td></td>
</tr>
</tbody>
</table>
3.2.5 LBO
3.2.5 LBO

Reasons for LBO

- A LBO often aims to the divestiture of a company or the sale of certain parts. In this case only a short-term financing is necessary, as profits are supposed to be realised quite fast.

- Leverage-effect: Equity return is increasing when the debt-level is increasing as long as the costs of debts stay below the return on assets. The debt-equity ratio therefore exercises a kind of leverage effect on the return on equity.

- Due to the high risk of a purchase price financing, it is necessary to take up high-interest loans in addition to the normal sources of capital. The different concepts conform to the assets and the free cash-flow of the individual target company.
### Finanzierungsformen beim LBO

<table>
<thead>
<tr>
<th>Area</th>
<th>Player</th>
<th>Financing form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional credit</td>
<td>Credit banks, insurance companies</td>
<td>Unsecured and by AV or UV secured short- and long-term credits</td>
</tr>
<tr>
<td>financing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subordinate loan capital</td>
<td>Investment banks, pension funds, insurance companies, venture capital</td>
<td>Subordinate loans, profit-participation certificate, high yield- or junk-bonds</td>
</tr>
<tr>
<td></td>
<td>and private equity-Financiers</td>
<td></td>
</tr>
<tr>
<td>Equity</td>
<td>Insurance companies, VC- and private equity-Financiers, private investors, management</td>
<td>Preferential shares, ordinary shares</td>
</tr>
</tbody>
</table>
Mergers & Acquisitions

3.2.5 LBO


Source: CMBOR/Barclays Private Equity/Deloitte & Touche
## Mergers & Acquisitions

### Ranking-list of investment banks in mergers and acquisitions worldwide

Transaction volume in billion US-$ (announced deals, year 2000, source: Thomson Financial Securities Data)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Consultant</th>
<th>Volume</th>
<th>Number of Deals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Goldman Sachs</td>
<td>1,054,50</td>
<td>213</td>
</tr>
<tr>
<td>2</td>
<td>Morgan Stanley Dean Witter</td>
<td>903,99</td>
<td>232</td>
</tr>
<tr>
<td>3</td>
<td>Merrill Lynch</td>
<td>837,39</td>
<td>158</td>
</tr>
<tr>
<td>4</td>
<td>Credit Suisse First Boston</td>
<td>514,51</td>
<td>212</td>
</tr>
<tr>
<td>5</td>
<td>UBS Warburg</td>
<td>444,54</td>
<td>128</td>
</tr>
<tr>
<td>6</td>
<td>J.P. Morgan</td>
<td>385,86</td>
<td>135</td>
</tr>
<tr>
<td>7</td>
<td>Schroders Salomon Smith Barney</td>
<td>350,84</td>
<td>199</td>
</tr>
<tr>
<td>8</td>
<td>Rothschild</td>
<td>337,03</td>
<td>109</td>
</tr>
<tr>
<td>9</td>
<td>Chase Manhattan</td>
<td>291,21</td>
<td>168</td>
</tr>
<tr>
<td>10</td>
<td>Deutsche Bank</td>
<td>255,58</td>
<td>123</td>
</tr>
<tr>
<td>11</td>
<td>Lazard</td>
<td>247,26</td>
<td>96</td>
</tr>
<tr>
<td>12</td>
<td>Bear Stearns</td>
<td>215,44</td>
<td>47</td>
</tr>
<tr>
<td>13</td>
<td>Lehman Brothers</td>
<td>203,80</td>
<td>125</td>
</tr>
</tbody>
</table>
• In 2000, detected by the European Private Equity and Venture Capital Association (EVCA), investments of associated companies increased to the record-number of over 50 billion €.
• According to survey of the investment bank UBS Warburg, there are more than 150 billion € waiting to be invested into buyouts in Europe.
• The biggest part accounts for Germany. In 2000, the Deutsche Bank reported in a survey called „Toppix“ that in 2001, the Deutschland AG should be radically remodeled. Analysts calculated with a massive deconcentration of the reciprocal investments of the consolidated companies.
• Since January 2002, such sales are tax-free.
• The buy-out potential is huge, especially because the German market is hardly developed so far. While the branch in Great Britain holds participations amounting to 2.1 % of the GDP, it amounts only to 0.8 % in Germany.
(source: Financial Times 2001)
3.3 Strategies of defence
3.3 Strategies of defence

3.3.1 Introduction
3.3.2 Motives for acquisitions
3.3.3 Funding of acquisitions
3.3.4 Measures of offence for the Raiders
3.3.5 Measures of defence of the Target
3.3.6 Barriers for Raids in Germany
A raid is the try of a hostile (or unfriendly) takeover of a company by a raider by purchasing the majority of the company’s shares.

- The term „hostile“ is relative and depends on the individual perspective and the herefore arising arising consequences.
- Hostile takeovers are not restricted to listed companies.

Raider Defence means the introduction of all appropriate measures to avert the hostile takeover of the own company.

In Germany this problem is – compared to the USA or Great Britain – not very significant so far, but it is becoming more important due to the growing market for company takeovers and participation.

Investment banks assume in connection with the realisation and defence of hostile takeovers consulting, financing and execution tasks.
A hostile takeover is characterised by the Raiders attempt to control a company by the acquisition of the (qualified) majority of shares.

- This is contrary to the companies interests and to the stakeholders interests. The management and the staff will therefore offer resistance.

- However this definition is problematic, as managers of the target call a takeover hostile when they are in fear of loosing their personal advantages.

- For shareholders a takeover is normally positive, as from experience the takeover premium is high and can amount to 15 to 150% of the market value.

- For other stakeholders, p.e. the staff of the target and it's investors, it depends on the detraction of their interests if the takeover is regarded as hostile.
On the one hand takeovers can be effected to implement expansion strategies. On the other hand, rationalisation-, liquidation- or restructuring measures can be the reasons for a takeover. However in an international competition these measures are often regarded as essential to assure the companies survivability and thus avoid the total loss of jobs and to hold up the relationship to other stakeholders.
Takeover bids can be calculated with a high debt capital quota.
- For the amortisation of high-graded takeovers oftentimes the whole Free Cash Flow must be used and assets must be liquidated.
- Investments can be desisted.
- Thus financially orientated companies are often classified as hostile.

The composition of the financial model of a hostile takeover is exceptionally complex.
- The all-dominant point is to have the capital for the implementation of the acquisition without showing the purchase intention.
- This means that all analyses and valuations are effected without the support of the target company.
- Banks which are selected and employed for the debt financing not only have to be convinced of the transactions success, but also have to come to a decision about a credit with the help of this secondary data.
The publication of the takeover attempt can cause short-term efforts of defence of the target.

These measures regularly aim to a quick raise of the acquisition value to prevent a takeover.

The thereby arising value enhancement, which is normally arbitrary and can hardly be estimated, must be considered in the raider’s financial calculus and according financial layers must be kept in reserve for eventual augmentations of the purchase price. As aforementioned hostile takeovers are not limited to listed companies.

- The market size, minority- and management rights as well as the impact of banks complicate hostile takeovers of listed companies.

- An expanding number of activities is expected from unlisted companies, where neither legal restraints nor takeover directives or disclosure requirements must be considered.
3.3.4 Offence measures of the Raiders

- For the implementation of a hostile takeover the Raiders use different measures to enlarge the chance of success of the transaction.

- To avoid a takeover-averse management, the Raiders submit a public offer (Tender Offer) for the majority acquisition of the company.
- The bided purchase price is higher than the current market value of the shares and thus is an incentive for the shareholders to sell their shares.
- This price is very risky, as the internal data of the target were not available for the Bidder for his rating of the Target.
- For the reinforcement of the purchase offer the following measures are used with typical anglo-american takeovers, which are in principle possible in Germany, too:
3.3.4 Offence measures of the Raiders

- The „Proxy Fight“ is an attempt to receive power of procuration from the shareholders to vote for an exchange of the management at an extraordinary general meeting.

- The „Saturday Night Special“ is the publication of the purchase offer at a moment in which the reaction time of the management is constricted.

- The „White Knight“ describes the overcall of a submitted offer of another Bidder.

- The „Bear Hug“ is the attempt to convince the supervisory body of the target to accept the offer.
Within the scope of a “Creeping Tender” blocks of shares are purchased via the stock exchange already before the takeover campaign. At this the disclosure requirements for participation are to be considered.

When “Greenmailing” the initial point is also the purchase of an participation up to 25% of the rights of vote. Together with votes of procuration the right of vote can be used to tilt the management or to force the management to buy the blocks back for a higher price.

A “Two Step Tender” reduces the financing requirements. The purchase of the required shares is partly paid cash and partly through an exchange of shares after the implementation of the merger.
The measures companies can take to prevent a hostile merger can be classified into long-term prophylactic measures and practical measures on short-term.

Further on, there are legal and managerial defence measures.

The prophylactic managerial measures aim to increase the price of a takeover or to retard it broadly.

- This includes for example an active and long-term Shareholder Value Policy which increases the company value and increases the price of a takeover.

The attempt of a hostile takeover indicates that resources of the company are not efficiently used.

- The Raider beliefs to be able to use the resources more efficiently.
- The inefficient use of resources can neither be on behalf of the owners nor of macroeconomic interest.
3.3.5 Defence measures of the target

- The staff and the managers can defeat a takeover by using the resources in a way that no additive use is possible whereby the Shareholder Value would lie above the market capitalisation.

- A legal measure is the emission of registered shares with restricted transfer.
  - For their transmission the acceptance of the management board is compulsory.
  - Indeed this allows the control of the shareholdings. However, because of considerable constraints of the fungibility, the discrimination and the therefore low market appraisal this measure is regarded as not seasonable.

- For non-voting preferred shares the situation is similar.
  - Indeed the issue of shares with a multiple right to vote to loyal shareholders or the legal or statutable granting of a maximum right to vote are suitable for averting a raider. However these measures do not conform to the principals of a capital market which is free of discrimination.
3.3.5 Defence measures of the target

- „Poison Pills“ are strategies which are often used. They imply special contractual clauses for a particular definition of the securities issued by the company.

- Normally this concerns option rights to purchase additional shares or an option for conversion.

- Theses rights are activated through a hostile takeover attempt.

- Thus it can be declared by the issue of convertible bonds, that in the case of a hostile takeover offer the options to conversion become effective directly.

- It is an additional possibility to provide the employment contracts of the management board with high severance charges („Golden Parachutes“) or clauses which make it impossible to exchange several managers at the same time („Staggered Boards“).

- A wide diversification of the shares as well as the attempt to find loyal associates or employee shareholders are additional possibilities to aggravate the purchase of shares.
3.3.5 Defence measures of the target

- The following short-term measures against a hostile takeover attempt feature by the possible simultaneity of the attack- and counter measure:

- The “White Knight“- defence measure is the attempt to find a third party which effects the takeover at the place of the hostile bidder.

- The sold of those assets („Crown Jewels“) which are especially interesting for the raider makes the target less interesting.

- The „Pac Man“ is the attempt to invert the takeover. The previous target supplies a takeover offer for shares of the raider.

- „Greenmailing“ can be used as a defence measure, too.
Further strategies for a short-term defence of a hostile takeover are to institute legal proceedings because of a violation of the competition law, to carry out a buyback within one means or to mount a media campaign for keeping the shareholders from selling their shares or exchanging them.

- Final measures are liquidations or partial liquidations.
- The necessity to raise the company’s market value is often discussed against the background of a high market value as the only chance to avert hostile takeovers.
  - By means of yield criteria, efforts to rise the purchase price of a takeover are surely useful to avert hostile takeovers.
  - It is often observable, that managers declare publicly, that the market value of their company is lower than the actual value.
Such declarations are supposed to cause a price increase and avert hostile takeovers. However they show a false estimation concerning a market-orientated valuation or an insufficient communication with the capital market.

- If the relevant information had been provided to the investors on time, such value gaps could not arise.

In addition to the price, synergy speculations, restructuring- and positioning opportunities must be mentioned as criteria for company takeovers.

- A bidder will carefully consider these criteria in his calculus.
- In view of the necessity of mergers and acquisitions in consolidating industries, price manipulations and attempts to avert takeovers thereby, can vastly affect the future competitive position of the emerging unit.
Takeovers which take place against the will of the management have inter alia for the following reasons been rare in Germany until now:

- In comparison to the USA or Great Britain only few companies are listed.
  - By the end of 1998 741 domestic companies have been listed in Germany while at the same time 7,555 domestic companies were listed in the USA and 1,957 in the UK.
- An ample part of those shares are attached to the industry, banks and insurance companies and thus is not available over the stock exchange.
- The vast portfolio of mutual participations which are not traded publicly and the mergers of german companies avert the substantial regrouping of important equity stakes:
  - By the end of 1998 german companies, banks and insurance companies held 54% of the total german portfolio.
3.3.6 Barriers for raids in Germany

- On the one hand, this demonstrates the influence capability that the German concerns have and on the other hand the prospect of the success to achieve a block of shares beyond the 50% barrier.
- Another reason for the low number of hostile takeovers in Germany is the negative approach of the universal banks.
- Banks are able to influence the behaviour of the raiders significantly by their credit engagement and by their financing of takeover transactions.
- In the end of 1998, all in all 10.3% of the shares of all German incorporated companies were in the stock of domestic credit institutions. With the possibilities to discipline stemming from credit engagements, their shares and their depot voting rights form clients, banks have a bearing that they can use against hostile takeovers.
3.3.6 Barriers for raids in Germany

- A distinctive protection of minority shareholders, e.g. in the form that 75% of the registered capital is needed to change the articles of association, demands a huge need for capital to secure that all planned measures can be executed after the takeover.

- According to the Right of Co Determination, one third of the seats in the supervisory board have to be reserved for employee representatives.

- This proportion is increased to one half if the public limited company has more than 2,000 employees.

- For certain measures, the supervisory board can have the right of codetermination given by the articles of association.

- From experience, labour representatives and not at least the public are negative about hostile takeovers.
Most barriers a raider in Germany has to take are structural and unchangeable in the foreseeable future.

Nevertheless, the financing behaviour of the big universal banks in Germany is changing and there are also some companies that discover the possibilities resulting from takeovers even against the will of the sitting board of directors.

To protect minority shareholders and employees, there presently is a discussion about a takeover code according to the Anglo-American sample and about the necessity of a takeover law.

In this context, there is above all the problem to balance the protection the employees, the rights of the minority and majority shareholders and the maintenance of a functioning and not discriminating capital market.
3.4 Merger consultation: The example of DaimlerChrysler
3.4 Merger consultation: the example of DaimlerChrysler

3.4.1 Motives for mergers
3.4.2 Mergers of Equals
3.4.3 Forms of mergers
3.4.4 The merger to DaimlerChrysler
3.4.5 Appendix
Motives for mergers

- **Mergers as a closing of a company purchasing I**

  **Organisational motives:**
  
  - Firstly, the merger can have the function to picture the efforts of the post acquisition-phase from a legal point of view.
  
  - When the acquiring company (within a strategic acquisition) is aiming at a mostly organisational integration of the target company, the amalgamation can be part of an integration process that follows an acquisition, that implements the integration of the acquired company also from a legal point of view.
3.4.1 Motives for mergers

- **Mergers as a closing of a company purchasing II**

**Fiscal motives:**

- As well at a preceding strategic takeover, the following merger can have purely financial reasons, i.e. it is determined by the fiscal policy.

- Utilisation of hidden reserves.

- Utilisation of accumulated deficits of the target company.

- When a company with high accumulated deficits is acquiring a highly profitable company: premature realisation of the accumulated deficits of the acquirer.
3.4.2 Merger of Equals

- **Merger consultation as its own business area**

**Merger of Equals:**

- Two companies, which are normally independent from each other, join their forces within the scope of a value relation from 50/50 until about 60/40.

- Here, – as opposed to hostile and friendly takeovers – there are no premiums paid to the shareholders.

- Alliances of this kind can be horizontal, lateral as well as vertical.
Advantages of Merger of Equals compared to acquisitions:

- In general, Mergers of Equals are large-volume transactions, that are quite often very hard to finance in the form of acquisitions.

- Because there are no control premiums that have to be paid, synergies benefit all shareholders equally.

- The Merger of Equals is more qualified to produce a productive and cooperative working environment than a takeover; this is applicable to the operative as well as the management level.
3.4.3 Forms of mergers

- **Merger by absorption**
  - One company disappears, in which its assets and debts vest in the other company, that also has to bear the legal consequences.

- **Merger by new foundation**
  - Both companies disappear in favour of a newly founded company.

- Fiscal differences, the relative importance of both companies, strategic thoughts regarding the Corporate Identity and other factors determine the form of the merger. Nevertheless, it is also thought of different constructions (see DaimlerChrysler AG) because for example international mergers are not possible until today.
Mergers & Acquisitions

3.4.4 Merger to DaimlerChrysler AG

The transaction volume and the fact that two important market participants merged within the scope of a partnership as well as the transatlantic bridging between different cultural, legal and economic areas ("Welt AG") attracted worldwide attention.

International stress of competition and technological innovations pushed the concentration process in the car industry, which is now headed by DaimlerChrysler as the manufacturer with the largest international cruising radius and the widest product range.

Aim of the merger:
- Realisation of synergies
- Attainment of growth potential

DaimlerChrysler has to match its realised synergies of over 6 billion € per annum with a turnover of 258 billion €, a surplus of 9.4 billion € and about 440,000 employees (figures form 1998).
Mergers & Acquisitions

3.4.4 Merger to DaimlerChrysler AG

• **Structure of the transaction**
  - Merger of Equals
  - Tax-free transactional and organisational structure for both parties.
  - Minimisation of the danger that the shareholders refuse.
  - Standardised equity title, realised by a global nominal share that is listed on 21 stock exchanges worldwide.
  - Pooling-of-Interest-method according to the US accounting principals to avoid encumbering amortisation of the Goodwill (value of the company).
  - To ease the integration: exclusion of minority organisations of both individual companies by creating a joined venture with a broad shareholder basis.
1. step: Transfer of both companies to an alliance

- Starting point of all events is a neutral shelf company of the private bank Oppenheim, that is re-named into „DaimlerChrysler AG“.

Contribution of the Daimler-Benz AG:

Within the scope of a public offer, DaimlerChrysler AG offered shares with an exchange ration of 1:1 to the shareholders of Daimler-Benz, that are standing against assets in kind in the way of the capital increase.

This exchange offer was excepted by 97% of all shareholders, so that the DaimlerChrysler AG as the parent company held the clear majority on the Daimler-Benz AG in this first step, whereas its old shareholders were now shareholders of DaimlerChrysler.

**Advantages of this method**

• Merger to DaimlerChrysler AG
• **Contribution of the Chrysler Corporation:**
  - Consolidation between a US-American and a German company is legally not possible.
  - A public exchange offer would lead to a situation where it is likely that not all shares can be brought together.

  → „Reverse Triangular Merger“

Execution of a Reverse Triangular Merger by a US-trustee, who collected all Chrysler shares against claims for DaimlerChrysler shares and than brought everything as a whole to the DaimlerChrysler AG within the scope of the capital increase in return for stocks. The old Chrysler shareholders became shareholders of DaimlerChrysler, while the Chrysler Corp. became a wholly owned subsidiary of the DaimlerChrysler AG.
Merger Daimler-Benz/Chrysler: 1. step

Merger to DaimlerChrysler AG
2. steps: Consolidation of the Daimler-Benz AG and the DaimlerChrysler AG according to German law

- The few shareholders that had still a holding in the Daimler-Benz AG became - due to the consolidation in the course of the universal succession - shareholders of the DaimlerChrysler AG, the Daimler-Benz AG expired.

- The consolidation was completed

- Renaming of the US-American company in „DaimlerChrysler Corp.“, but it stayed wholly owned subsidiary.

- After the completion of the transaction, the new company was firstly listed under the symbol „DCX“ at the 17.11.1998.
Daimler-Benz AG

Former Daimler-Benz and former Chrysler shareholders

DaimlerChrysler AG

Consolidation

97%

Daimler-Benz AG

100%

DaimlerChrysler Inc.

Merger Daimler-Benz/Chrysler: 2. step

Merger to DaimlerChrysler AG
Basic tasks of the investment banks in the course of this transaction:

- Conduct of negotiations (respectively accompaniment of negotiations)
- Structuring of the transaction, that had to enter completely new territory.
- Coordination of other consultants and service providers like lawyers, accountants and tax advisors.
EXCURSUS: Pooling-of-Interest-Method

- Synonym: Merger Accounting

- Nowadays, the Pooling-of-Interest-Method is constricted after the US-GAAP.
- Optionally – instead of the purchase method – on clearly defined conditions applicable method of investment consolidation of concerns (full consolidation), that fuse as equal partners (merger of equals).

Here, assets and debts are transferred from the trade balance sheet II to the consolidated balance sheet without any changes. No goodwill is created. No release of hidden reserves. No effect on profits in the following period.
• **Advantages of the method of the Daimler-Benz AG**

- The advantage of this method with a high involvement of the shareholders is that the DaimlerChrysler AG as the mother company is able to conduct the restucturing with the help of the German law regulating the transformation of companies without the fear of suspensiveness due to claims and lawsuits. Only the amount of the severance charge might be reviewed ex post by a court.
Reverse Triangular Merger (not existent within Germany)

- Here, the acquirer sets up a subsidiary and provides it with shares of the parent company. Afterwards, the subsidiary is affiliated with the target company; hereby, the shareholders of the target company are "compensated" with shares of the parent company. In the economical result, the target company becomes a wholly owned subsidiary of the parent company and its shareholders become shareholders of the parent company. The advantage of this construction is on the one hand that all shares of the target company can be collected and on the other hand that only a simple majority decision of the target company's shareholders is needed.
Fiscal motives (Details)

- In contrast to the acquisition, consolidations offer the possibility for the acquirer to utilise acquired hidden reserves because within the course of the affiliation, the book values of the disappearing company can be increased free of tax and later on, they can be depreciated tax efficiently.

- Likewise, possibly existing accumulated deficits of the target company can be utilised by the acquirer after the consolidation. The purchase with the following affiliation is only tax-efficient, if the target company’s business operations stay alive, § 8 ($) KStG. The purchase of a company which doesn’t operate and which has only assets in the form of loss carry forwards (Mantelkauf) is therefore not tax-efficient.
3.5 RJR Nabisco Case Study
-A company is depredated-
Involved leading characters:
At RJR Nabisco:
Ross Johnson (CEO)

At Shearson Lehman Hutton:
Peter Cohen (General director); Tom Hill (Director of the M&A-department)

At Salomon Brothers:
John Gutfreund (Chairman)

At Kohlberg Kravis Roberts & Co.:
Henry Kravis (Pillion rider)

At Forstmann Little & Co.:
Theodore J. Forstmann (Pillion rider)

Here, only a small selection of altogether 67 persons who strongly influenced the process is presented. All in all, the whole Wall street was has been engaged in the takeover fight for more than 4 weeks.

The Nabi$co Story
Ross Johnson:

- Prototype of the „Noncompany Men“ in the 80s. They committed themselves to the company investors and not the company traditions. They have been referred to as „gaggle of business nomads that are addicted to deals and profits“.
- Johnson was the most eye-catching man of the Noncompany Men. He was characterised as someone who „didn't mince matters, concluded the biggest deals, had the highest expense account and was frequently impulsive towards his employees“.
- Johnson's favourite occupation was the restructuring of companies, even if there was nothing to restructure. His favourite saying towards his employees was: „In a company, you always have to keep the shit hitting the fan“.
- Johnson won favour with his leading employees by giving them company villas and the most expensive company cars. The whole clique around Johnson was called „Merry Men“.
- Johnson's company, Standard Brands, merges with the conservative concern Nabisco to Nabisco Brands. Within the new company, Johnson took the position of the COO. In the media, this consolidation denounced as the a consolidation between the Rotarians and Hell's Angels.
Ross Johnson:

- After Johnson became – due to numerous internal intrigues – CEO of Nabisco Brand, he induced a consolidation with RJ Reynolds Tobacco Company to the new concern RJN Nabisco.
- The shares of the new concern developed underproportionally. Because Ross J. himself was significantly involved in the new concern, he decided to sustainably increase the market capitalisation.
- As the cause, Johnson identified the cash flows of the company, which are difficult to forecast for analysts.
- His plan was to present constantly but not too strong increasing CFs to the analysts.
- The “surplus“ CFs from the tobacco business, 1.2 billion per annum, should be spend.
- So, Johnson built one of the biggest Lear-Jet fleets of all companies inclusive its own tower at the air port of Atlanta. The close-by hanger of Coco Cola seemed unimpressive next to the one of RJR Nabisco.
- In addition to that, Johnson initiated a close contact to American top athletes. He paid the sportsmen millions to make them speak to his employees in the Nabisco headquarter once a year. This was accounted for marketing expenses.
Kravis:

• Kravis was regarded as the LBO king at Wallstreet. The biggest LBOs were accomplished by his venture capital company KKR (Kohlberg, Kravis, Roberts).
• Thereby, he bought companies, gave a part of the companies to the management and sold remaining parts via the stock exchange or M&A transactions.
• The cash for the implementation of a purchase partially derived from KKR funds.
• In 1983 the KKR fund gained a yield of 63% for his investors.
• The other part of transactions was financed by Junk Bonds.
• KKR’s war chest was bigger than the GNP of Pakistan or Greece.
• The sum of companies controlled by KKR would at this time have belonged to the 10 biggest groups of the USA.
• Kravis owned ¼ of the worldwide capital which was available for LBOs.
• In 1987 Kravis offered to R. Johnson, a LBO amounting to 90$ per share or 20 billion $ company value. The share price at that time was 70$. But Johnson did not accept the offer.
Peter Cohen/Tom Hill:

• All but one year after Kreavis offer Cohen/Hill supplied an LBO offer to Johnson, too.
• The intention of the Shearson Bankers was the positioning of the bank on the booming LBO market.
• Johnson agreed at the following conditions:
  20% of profit participation at Nabisco for the management (ca. 2.5 billion $)
  The Nabisco air fleet was kept as well as all privileges for the management and the financing of top athletes by Nabisco.
• Cohen/Hill created the following plan:
  Week 1-3: preliminary studies for the valuation
  Week 4-5: Elaboration of a credit structure
  Week 6-7: Decision of a LBO by the management board
  Week 8-9: Publication of the LBO offer and negotiations about the offer and possible further offers with a neutral commission (The commission was supposed to represent the interest of the staff and the shareholders. It was meant for negotiating ideal conditions during the M&A activities.)
  Week 10: Signing of the acquisition contract.
Peter Cohen/Tom Hill:

- The risk of this LBO consisted of the possibility for everybody to bid while the commission had to decide about the best offer.
- The only serious competitor for Cohen/Hill was Kravis, as he was the only one who was able to finance a 20 billion $ takeover.
- However, it was assumed that Kravis would not be interested in Nabisco because of their tobacco activities.
- Another reason against Kravis and other competing bidders was the fact, that the management collaborated with Cohen/Hill and thus was able to reveal synergy potential which allowed to calculate the maximum company value to pay.
- All competitive bidders could value the company only by its business reports and therefore would have bought, citation Cohen: “a pig in a poke”
- Cohen/Hill opened their offer at 75$ per share.
- When Kravis heard about the LBO „he fretted and fumed, tarnished to green and blue and afterwards spluttered: war“
- Kravis found, that the Nabisco LBO had been his idea and that 75$ per share was an impudent offer which only served for enriching the management.
Kravis:

- Kravis hired the best advocates and M&A advisers on Wallstreet to deploy a plan of action. In doing so he employed more persons than he would have needed, only to anticipate Cohen/Hill could get them.
- The counter offer, developed by Bruce Wasserstein (a young and promising M&A advisor) was finally accepted and Kravis offered 90$ per share. This offer was also meant to show to the public, that the 75& per share, offered by Cohen/Hill equalled a thievery.
- A jawing-match developed between Cohen and Kravis. All mediation efforts to implement this deal conjointly, failed.
- Johnson had realised, that the LBO was no longer under his control and that for Cohen and Kravis only their prestige imported instead of the company.
John Gutfreund:

- Chairman of Salomon Brothers, wanted to engage in the bidder battle and submit his own offer.
- His plan was the following:
  At first Salomon Brothers purchases 5% of the share capital on the stock exchange. Afterwards he appeals to the supervisory board with a Bear Hug to purchase the remaining shares.
- But when Gutfreund tried to engage external advisors and advocates for this deal he found that in the meantime every advisor and every advocate on Wallstreet was busy with Nabisco.
- Merely a Canadian M&A chamber offered services to him.
- Hereupon Gutfreund abolished his plan and abandoned his engagement.
Ted Forstmann:

- Similarly to Kravis he was a LBO specialist, too.
- Was an arch-enemy of Kravis and detested M&A activities with Junk Bonds (called Junk Bonds “funny money”)
- Wanted to align with Cohen/Hill to implement the transaction together with him.
- Forstmann would place money from his LBO fund at the disposal. In exchange Cohen/Hill were not permitted to finance the LBO with Junk Bonds.
- At first his proposal was accepted.
Cohen/Hill:

- Cohen and the management group were shocked from this offer. They didn’t want to pay more than 80$ per share.
- A trader strategy was used as counter offer: The offer should be marginally augmented and it should be waited and seen.
- The Management group submitted an offer of 92$ per share.
- The investment banker Cohen/Hill kept secret that this offer would only pay if Johnson sold a part of his air fleet.
- Furthermore in the meantime the sum had to be financed with Junk Bonds which made T. Forstmann abandon the deal.
For Kravis, this offer was too high. He didn’t have the management group on his side and therefore, he has not been able to feed his computer simulation with internal data. Kravis thought about leaving the bidding battle. Shortly before the deadline to hand in biddings, J. Greeniaus spoke to Kravis. Greeniaus was director at Nabisco Brands, a subsidiary of RJR Nabisco. Once, Johnson had promised a position in RJR Nabisco’s board of directors, but he never kept his promise. Greeniaus was not allowed to participate in the LBO of the management group as well. Greeniaus reported about the lavishness at RJR and gave away all internals to Kravis. On the basis of these statements, the Kravis group submitted a quote of 100$ per share.
In the three following days, events happened very fast. All in all, there has been seven offers and counteroffers. When the deadline for submission of quotations expired, Kravis had offered 109$ per share, whereas the management group had offered 112$ per share. At first glance, the offer of the management group seemed to be more attractive. Nevertheless, the financing at Kravis has been much more solid. The committee decided in favour for Kravis offer. RJR Nabisco has been sold to the KKR group. Johnson and his „Merry Men“ had to capitulate. Greeniaus became new CEO at RJR Nabisco. All expenses for top athletes and nearly the whole air fleet were cancelled. But there was one thing Johnson achieved: Within six days, the share price rose of about 50%.
When the transfer has been implemented, $18.9 billion had to change its owner and junk bonds with a value of $5 billion had to be placed within one day.

For the rest of the money, loan commitments have been realised.

The Federal Reserve Bank has only been able to transfer money up to a value of one billion $, so the banks transferred the money in tranches of between 800 and 950 million $.

The monetary flow has been so powerful that the money supply statistics of the USA swelled up temporarily.

When Johnson has to leave, he got a compensation of 20 million $.

Shortly after the Nabisco LBO, the market for junk bonds broke down.

Numerous „Noncompany Men“ and investment bankers have been arrested because of different criminal offences (also in connection with Nabisco).

After the Nabisco LBO, the time of „Casino-Society“ seemed to be over.

Nabisco has been soled to the Kraft group. The Kraft group nowadays belongs to Philip Morris.
3.6 Tasks and products of the investment bank within Mergers & Acquisitions
Mergers & Acquisitions

- Optimisation of the process-control
  - Optimisation of the responsibility assignment
  - Monitoring of the interfaces between the different groups of persons that are involved in the deal

- Contribution of special professional competences
  - Optimisation of the deal with regard to fiscal, corporate law and financing aspects.

- Identification function
  - Because M&A transactions do not belong to the daily business of most companies, there are most of the time important information about the M&A market missing, especially about potential acquisition objects or about potential buyers. The consultant who is acting within this market professionally disposes of a much better market overview and is able to obtain the necessary information faster, more detailed, more reliable.

Tasks & Products
Mergers & Acquisitions

• Sparring partner and objectifying functions
  - Before the actual deal, the consultant can contribute to the finding of the strategy and to its evaluation by introducing new ideas from his external point of view and by scrutinising the ideas that have been developed internally. During the following contract negotiations, the consultant is able to conduct them less emotionally and therefore possibly more promising.

• Equalisation of personal capacity bottlenecks of the client
  - If the existing employee resources are not sufficient to conduct such a deal in adequate time and quality, the use of external consultants is a possibility to involve the needed and qualified personal in the form of mixed teams at short notice.

• Lightning rod function
  - If a consultant acts on behalf of his client, it is possible to correct negotiation tactics that turn out to be inadequate after the event („unapproved approach of the consultant“)

Tasks & Products
Real Options
Real Options

Agenda

- Corporate flexibility
- Scopes
- Scopes and application area of Real Options
- Net present value extended
- Value of flexibility
- The option value matrix
- Evaluation of a strategic learning-option with Black Scholes
- Strategic management in consideration of Real Options
- The modified option value matrix
Corporate flexibility

- managerial decisions are characterised by insecurity and a high degree of irreversibility → request for flexibility
- the most important questions are:
  - How can you value flexibility?
  - Which consequences have management decisions for the value of flexibility?
  - Which arrangements help to improve e.g. the quality of managerial decisions, achieve a value added for the shareholders and increase the adaptiveness of companies to change environmental conditions?
Corporate flexibility

- Costs of flexibility ⇒ higher conversion costs and costs of capacity (Jakob, 1990) ⇒ lower acclimatization costs
  ⇒ the fixing of the flexibility with
     optimal costs is problematic because of stochastic influencing factors
- Benefit of flexibility ⇒ possibility to create and use additional (defensive and offensive) scopes
  ⇒ defensive scopes protect the company against losses, e.g. break off of a „R&D“-programm
  ⇒ offensive scopes allow the use of new chances, e.g. the opening of new markets, the acquisition of a product license
  ⇒ scopes allow companies the transformation of symmetric profit-loss-relations in asymmetric allocations

Real Options
Real Options

Scopes

No scope

Defensive Scope

Offensive Scope

Likelihood

Possible values of investment

Dr. Martin Užík
Real Options

Scopes

• Offensive Scopes allow the company the use of chances that are created from insecurity and irreversibility as assumption for the build up of strategical potential of success, while defensive scopes absorb joint dangers.

• Thus the build up and the exercise of scopes can be seen as corporate decision for the handling of insecurity and irreversibility; Cause the value of scopes is unaccounted for traditional economic measurements it is necessary to integrate this component into the project- and company evaluation.
## Real Options

### Scopes and application area of Real Options

<table>
<thead>
<tr>
<th>Option type</th>
<th>Scopes of the management</th>
<th>Application area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagging option</td>
<td>Temporary delay of transaction</td>
<td>Exploitation of raw material deposit</td>
</tr>
<tr>
<td>Extension and consolidation option</td>
<td>Flexible assimilation of project volume</td>
<td>Joint Ventures, portfolio investments</td>
</tr>
<tr>
<td>Stop option</td>
<td>Project task</td>
<td>Product launch</td>
</tr>
<tr>
<td>Growth option</td>
<td>Accomplishment of a following capital expenditure</td>
<td>Strategic branches, „R&amp;D“</td>
</tr>
<tr>
<td>Changing options</td>
<td>Adjustments to relative prices changes by substitution</td>
<td>process optimization</td>
</tr>
</tbody>
</table>

Dr. Martin Užík
Scopes

- The outcome of the net present value method (NPV) is:

\[ \text{NPV extended} = \text{NPV} + \text{value of flexibility} \]

**NPV extended**: extended net present value
**NPV**: passive net present value
**value of flexibility**: value of scopes

- The risk-structure of scopes in management decisions shows analogies to the risk-structure of financial options (see next slide)
Real Options

Scopes

Real investment

- Gross project value (present value of gross-CF)
- Capital expenditure
- Time period in which the investment can be conducted
- Time value of money
- Insecurity of expected gross-CF

Value drivers of options

- Stock price ($S$)
- Exercise price ($X_{Ex}$)
- Maturity ($t$)
- Risk free ($r_f$)
- Volatility of stock price ($\sigma$)

Financial options (stock option (call))

- Stock price
- Exercise price
- Maturity
- Risk free
- Volatility of stock price

---

Dr. Martin Užík

Seite 9
Real Options

Net present value extended

- The Net Present Value extended (NPV extended) and the passive Net Present Value (NPV) are identical if the value of scopes is exactly zero; this is the case e.g. if the investment date cannot be delayed.

Passive Net Present Value (NPV)

Gross project value – Capital expenditure

\[ \text{NPV} = S - X \]

Option value

if \( t = 0 \Rightarrow rf \) and \( \sigma \) don't effect the option value; for a call option follows

\[ C_T = \max ( S - X ; 0 ) \]
Real Options
Net present value extended

- The value of scopes is not zero if by a lag of time in the project implementation
  
a) a benefit of time value results

b) additional information about insecurity of the project and changes of the environment influence the management decisions
Real Options

Net present value extended

a) The benefit of time value is defined by the remaining horizon of flexibility and is measured by the net present value of the capital expenditure

\[ PV(X) = \frac{X}{(1 + r_f)^t} \]

\[ NPV_Q = \frac{S}{PV(X)} \]

\[ NPV = S - PV(X) \]

b) The benefit of flexibility is determined by the insecurity of the expected gross cash-flows and is measured by the cumulative volatility \( (\sigma \sqrt{t}) \)

\( \Rightarrow \) can be estimated by historic and implied volatility, respectively, or by simulation processes (e.g. Monte Carlo method)

Dr. Martin Užík
Real Options

Value of flexibility

Real investment

Gross project value (present value of gross-CF)

Capital expenditure

Time period in which the investment can be conducted

Time value of money

Insecurity of expected gross-CF

Value drivers of options

Stock price

Exercise price

Maturity

Risk free

Volatility of stock price

Financial option (call option)

Option value matrix

NPV\_Q

\( \sigma \sqrt{t} \)

NPV\_Q

\( \sigma \sqrt{t} \)

Dr. Martin Užík
Real Options

The option value matrix

The development of the value of scopes (call option)

The value of flexibility rises into this direction
# Real Options

## Evaluation of a strategic learning-option with Black Scholes

### NPV <sub>Q</sub>

<table>
<thead>
<tr>
<th></th>
<th>0.80</th>
<th>0.82</th>
<th>0.84</th>
<th>0.86</th>
<th>0.88</th>
<th>0.90</th>
<th>0.92</th>
<th>0.94</th>
<th>0.96</th>
<th>0.98</th>
<th>1.00</th>
<th>1.02</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>2,0</td>
<td>3,1</td>
</tr>
<tr>
<td>0.10</td>
<td>0,0</td>
<td>0,1</td>
<td>0,2</td>
<td>0,3</td>
<td>0,5</td>
<td>0,8</td>
<td>1,2</td>
<td>1,7</td>
<td>2,3</td>
<td>3,1</td>
<td>4,0</td>
<td>5,0</td>
</tr>
<tr>
<td>0.15</td>
<td>0,5</td>
<td>0,7</td>
<td>1,0</td>
<td>1,3</td>
<td>1,7</td>
<td>2,2</td>
<td>2,8</td>
<td>3,5</td>
<td>4,2</td>
<td>5,1</td>
<td>6,0</td>
<td>7,0</td>
</tr>
<tr>
<td>0.20</td>
<td>1,5</td>
<td>1,9</td>
<td>2,3</td>
<td>2,8</td>
<td>3,4</td>
<td>4,0</td>
<td>4,7</td>
<td>5,4</td>
<td>6,2</td>
<td>7,1</td>
<td>8,0</td>
<td>8,9</td>
</tr>
<tr>
<td>0.25</td>
<td>2,8</td>
<td>3,3</td>
<td>3,9</td>
<td>4,5</td>
<td>5,2</td>
<td>5,9</td>
<td>6,6</td>
<td>7,4</td>
<td>8,2</td>
<td>9,1</td>
<td>9,9</td>
<td>10,9</td>
</tr>
<tr>
<td>0.30</td>
<td>4,4</td>
<td>5,0</td>
<td>5,7</td>
<td>6,3</td>
<td>7,0</td>
<td>7,8</td>
<td>8,6</td>
<td>9,4</td>
<td>10,2</td>
<td>11,1</td>
<td>11,9</td>
<td>12,8</td>
</tr>
<tr>
<td>0.35</td>
<td>6,2</td>
<td>6,8</td>
<td>7,5</td>
<td>8,2</td>
<td>9,0</td>
<td>9,8</td>
<td>10,6</td>
<td>11,4</td>
<td>12,2</td>
<td>13,0</td>
<td>13,9</td>
<td>14,8</td>
</tr>
<tr>
<td>0.40</td>
<td>8,0</td>
<td>8,7</td>
<td>9,4</td>
<td>10,2</td>
<td>11,0</td>
<td>11,7</td>
<td>12,5</td>
<td>13,4</td>
<td>14,2</td>
<td>15,0</td>
<td>15,9</td>
<td>16,7</td>
</tr>
<tr>
<td>0.45</td>
<td>9,9</td>
<td>10,6</td>
<td>11,4</td>
<td>12,2</td>
<td>12,9</td>
<td>13,7</td>
<td>14,5</td>
<td>15,3</td>
<td>16,2</td>
<td>17,0</td>
<td>17,8</td>
<td>18,6</td>
</tr>
<tr>
<td>0.50</td>
<td>11,8</td>
<td>12,6</td>
<td>13,4</td>
<td>14,2</td>
<td>14,9</td>
<td>15,7</td>
<td>16,5</td>
<td>17,3</td>
<td>18,1</td>
<td>18,9</td>
<td>19,7</td>
<td>20,5</td>
</tr>
<tr>
<td>0.55</td>
<td>13,8</td>
<td>14,6</td>
<td>15,4</td>
<td>16,1</td>
<td>16,9</td>
<td>17,7</td>
<td>18,5</td>
<td>19,3</td>
<td>20,1</td>
<td>20,9</td>
<td>21,7</td>
<td>22,4</td>
</tr>
<tr>
<td>0.60</td>
<td>15,8</td>
<td>16,6</td>
<td>17,4</td>
<td>18,1</td>
<td>18,9</td>
<td>19,7</td>
<td>20,5</td>
<td>21,3</td>
<td>22,0</td>
<td>22,8</td>
<td>23,6</td>
<td>24,3</td>
</tr>
<tr>
<td>0.65</td>
<td>17,8</td>
<td>18,6</td>
<td>19,3</td>
<td>20,1</td>
<td>20,9</td>
<td>21,7</td>
<td>22,5</td>
<td>23,2</td>
<td>24,0</td>
<td>24,7</td>
<td>25,3</td>
<td>26,2</td>
</tr>
<tr>
<td>0.70</td>
<td>19,8</td>
<td>20,6</td>
<td>21,3</td>
<td>22,1</td>
<td>22,9</td>
<td>23,6</td>
<td>24,4</td>
<td>25,2</td>
<td>25,9</td>
<td>26,6</td>
<td>27,4</td>
<td>28,1</td>
</tr>
</tbody>
</table>

**S** = 100  
**X** = 105  
**t** = 1 year  
**r_f** = 5%  
**σ** = 50% p. a.

\[ \sigma \sqrt{t} = 0,50 \]

By use of the option value matrix follows a value of flexibility of 19,7%.

Thus it follows for the value of scopes:

\[ C = 0,197 \times 100 = 19,70 \]

\[ \Rightarrow \text{NPV}_Q = 1,0 \]

Passive Net Present Value:

\[ \text{NPV} = S - X \]

\[ = 100 - 105 = - 5 \]

Extended Net Present Value:

\[ \text{NPV}_{ext} = \text{NPV} + C \]

\[ = - 5 + 19,7 = 14,7 \]
Real Options

Strategic management in consideration of Real Options

- If the concept of valueing flexibility in single projects is transferred to the entirety of the company decisions, all of them are to be understood as a systematical and continuous process of identification, evaluation and management of Real Options.

  „To me all kinds of business decisions are options“

- Thus the task of the management is to identify systematically useful Real Options, to build up a portfolio of Real Options and to manage this portfolio optimal, i.e. to conceive and realize optimal exercise-strategies.

- It is necessary to modify the option value matrix and constitutively to conduct an active portfolio management of participations and projects.
The modified option value matrix

Real Options

<table>
<thead>
<tr>
<th></th>
<th>low</th>
<th>1</th>
<th>high</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- In no case: 6
- Immediately: 1
- Probably not: 5
- Maybe immediately: 2
- Maybe later: 4
- Probably later: 3

Dr. Martin Užík
Real Options

The modified option value matrix

Region 1 und 6:
In both regions the cumulative volatility is very low, therefore the company decision solely results from the NPV ratio (value-to-cost metric).

Region 1:
NPV-Ratio > 1 ⇒ project should be conducted „immediately“

Region 6:
NPV-Ratio < 1 ⇒ no project realisation („in no case“).
Real Options

The modified option value matrix

Region 2 und 3:

In both regions the NPV-ratio is $> 1$ and the management has the possibility to use a benefit of flexibility by a delay of the project realisation. Above (below) the diagonal these projects are located, whose passive Net Present Value (NPV) is positive (negative) and which are „in the money“ („out of the money“). On the diagonal the NPV is $= 0$. 
**Real Options**

**The modified option value matrix**

**Region 2:**

NPV > 0 ⇒ in spite of the possibility of a delay, the management should decide to conduct the project soon ("maybe immediately"), because a delay can result in an obsolescence of the Real Options (e.g. by the market launch of a competitor, the loss of market shares, adversarial changes of the general conditions in the company environment).
The modified option value matrix

Even though the exercise of the option abolishes the benefit of flexibility, the immediate accomplishment of the project can - analog to an early exercise of an American stock option with dividend payment - be optimal.

Region 3:

NPV < 0 ⇒ in this region the management should not conduct the project immediately ("probably later"), because the passive NPV is negative and these projects - because of the niveau of the cumulative volatility - possess a high amount of flexibility.
Real Options

The modified option value matrix

**Region 4 und 5:**

In both regions the NPV-Ratio is $< 1$ and the NPV is $< 0$. Above (below) the diagonal these projects are located, whose Net Present Value extended (NPV extended) is negative (positive). On the diagonal the Net Present Value extended is $= 0$.

**Region 4:**

NPV extended $> 0 \Rightarrow$ because the strategic value of flexibility dominates the passive negative NPV, manager will tend to hold the option of an accomplishment of the project and to execute projects in this region „maybe later“.
Real Options

The modified option value matrix

Region 5:

NPV extended < 0 ⇒ because the cumulative volatility and the NPV-ratio are relatively low, the management decision is with „probably not“ rather negative.
Real Options

The modified option value matrix

With the presented option value matrix, a strategic management concept has been developed. In this context normative acting recommendations can be derived. In difference to traditional portfolio concepts (e.g. BCG-concept), it cannot only deliver an explicit evaluation of scopes of the management. Moreover it draws attention on the cumulative volatility of the expected CF’s which is crucial to management decisions in the area of financial investments as well as in the case of real investments.
Real Options

The modified option value matrix

<table>
<thead>
<tr>
<th>low</th>
<th>relative market share</th>
<th>high</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>market growth rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>high</td>
<td></td>
</tr>
</tbody>
</table>

Dr. Martin Užík